

Wm. Jones

TEXTILE WORLD
KINK BOOK—VOL. X

COMPILED FROM THE COLUMNS OF
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BY

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(Technical Editor, Textile World)

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FOREWORD

It is always a great pleasure to present a new Kink Book to our friends who read TEXTILE WORLD. So many of these friends co-operate during the year in supplying material for the Questions and Answers Department of TEXTILE WORLD that we really consider the publication of these annual Kink Books to be a mutual undertaking.

For the information of new readers we might explain that for many years it has been the practise of the publishers of TEXTILE WORLD to compile what they consider the best technical questions and answers submitted by mill men during the preceding year and to publish this in handy book form. If your travels take you among the mills, you will find thousands of superintendents and overseers who have considerable collections of these annual Kink Books. Any practical mill man who has such a collection of Kink Books possesses a technical library on practical mill work which can scarcely be excelled. There are few problems in mill operation, production and management which have not been covered by these questions and answers.

The demand for Kink Books has been so large that we have had to place a price of \$1.00 per copy for those who are not subscribers to TEXTILE WORLD. Every subscriber to TEXTILE WORLD is entitled to his choice of one Kink Book free with each year's subscription. Subscribers who wish to acquire additional Kink Books may purchase them at the special price of 75 cents per copy.

We take this occasion to acknowledge our indebtedness to the many contributors to TEXTILE WORLD, including manufacturers, superintendents, overseers and experts in mechanical and chemical lines. We also extend a hearty welcome to all those engaged in the textile industry who may wish to use the facilities of our organization for getting information on any problem whatsoever.

C. H.

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Boucle Yarn Manufacture

We would appreciate your giving us information relative to the making of a boucle type of yarn. This is to consist of a twisted yarn, showing one thread in rather exaggerated loops. (5895)

Boucle yarns are produced by the twisting of different sizes of yarn together, and also by allowing one of the combination to move quicker than the others in the twisting, the thread which has the greater speed being compelled to form into loops or curls upon the surface of the other, owing to the difference in length. Boucle effects may be formed in the cloth by fulling, one of the threads being of a hard and unshrinkable character, the other being a soft milling fiber and of a much heavier count of yarn, so as to overpower the unshrinkable one and cause it to curl around the fulling one, owing to the loss of length or shortening process which takes place in the operation of fulling.

Usually these yarns are a combination of a low quality worsted with mohair, the mohair thread being the thicker and allowed to run in varying proportions of length, generally two inches of mohair to one inch of worsted, or other proportions, according to size of loop or curl required. Of course it is necessary to bind the two together with another thread, as otherwise they would separate in the cloth, or the curl thread would be liable to draw straight in patches, causing a very unsightly appearance upon the face of the fabric.

One very acceptable form of yarn which may be made in many very suitable and pleasing effects is as follows: Two-ply 32s twisted with single 10s, the 10s being allowed to run two inches to one inch of the 2-ply. This, in the operation of twisting, causes the thread of 10s to form into small

loops upon the surface of the 2-ply. This compound thread is then twisted with one of single 32s in the reverse direction, which binds the thread into a weavable yarn and fixes the curls permanently. The effect of fulling on this class of fabric causes the thick curl yarn to burst and swell into a very lofty and springy surface.

Determining Colors Used on Dyed Goods

I am attaching hereto two sample clippings, one marked "A" and one marked "B." I will appreciate it if you will determine for me whether or not these samples have been sulphur or indanthrene dyed. (5890)

The two samples are of a heavy cotton fabric dyed a gray shade. Neither of these samples were reduced when heated with a solution of hydrosulphite and caustic soda. A weak solution of sodium hypochlorite very quickly decolorized both samples. These results, coupled with the nature of the goods, lead us to believe that the dyeing was done with sulphur colors.

Line and Angle for Schreiner

I am writing you to see if I can obtain some information on schreiner calender work. I would like to know whether there is any set rule as to what line and angle of line any certain class of cloth requires. How do the plants that do this work know what line to use for the best results on the different classes of cloth? (5889)

In selecting the proper type of engraved line for the steel roll in a schreiner calender, there are really no set rules that can be followed. As a matter of fact, there are so many different lines in use today that a great many of the finishes are really not correct. Many of them may be termed mongrel lines, which have been developed to meet the ideas of converters. An old formula for figuring the line is as follows:

On filling sateens the line is usually engraved about 7 deg. off the vertical position and to the right, the number of lines counting from 220 to 260 to the inch, dependent upon the counts of the yarn in the filling. On warp sateens 260 lines is the usual type of engraving and the position of the line is 5 deg. to the right of the horizontal position.

It is a good idea to figure on the number of lines to the inch, in either case, as being 3 to $3\frac{1}{2}$ times the count of the threads in either the filling or the warp, dependent upon the type of sateen. The line in every case should run at an angle with the twist of the yarn. Hard twist yarns may finish better with a little greater angle on the line; that is, increase the angle $1\frac{1}{2}$ deg. for a hard twist yarn, especially on filling sateens. We would suggest that the inquirer also be governed a great deal by the engraver that he selects to do the engraving of his steel rolls. Such concerns can always copy a line already embossed or schreinered on a piece of finished fabric.

Formula for Quick Drying Glue

Please send me a formula for a glue to use on chenille. I want a glue that will dry quickly. We are running a chenille about $3/16$ in. diameter made from rayon floss and silk floss. (5710)

For a quick drying glue we would suggest that the inquirer incorporate with his glue the volatile solvent acetone. This would have a tendency to increase the drying properties of the glue. Another suggestion is to employ a low grade glue. In this way a greater amount of glue can be got in a given volume of solution than with a high grade glue. In other words, it is possible to procure a higher concentrated glue and with such a solution the time of setting is much quicker.

Bleached Cotton Turns Yellow in Storage

Our bleached cotton turns yellow after a short while in storage. We would like to inquire of you how this might be remedied. Our bleaching process is as follows: 10 hrs. boil under a pressure with a small percentage of caustic soda, following with regular chloride of lime bleach and sulphuric acid sour. Thereafter the blueing and soaping in one operation. (5681)

There are various causes for the yellowing of bleached cotton on storage. One of the most common causes is incomplete boiling-out. Raw cotton contains about 5% of non-cellulose impurities, and if these are not removed by

the bleaching process the fibers are liable to turn yellow on storing. A simple test to determine whether the cotton is thoroughly bleached is to steam a sample for one hour in a small autoclave, such as a pressure cooker used for domestic purposes, at 5 lbs. pressure. If the cotton remains white, a good bleach is indicated; if it turns yellow or brown, insufficient boiling is shown.

The inquirer does not state what percentage of caustic he uses in the kier, but if less than 5% on the weight of the cotton is employed it would be advisable for him to increase the amount to that percentage. If the yellowing in this case is caused by faulty bleaching, as determined by the steaming test outlined, increasing the amount of alkali used in the kier boil should eliminate the trouble.

Another point which should not be overlooked is that discoloration may also be caused by certain soaps, oils, and softeners used in the treatment of cotton after bleaching. If it is found that the goods have been properly bleached, and yellowing still occurs, it is probable that the soaping operation is at fault.

Painted Awning Stripes

We understand that there is a process in the United States of painting stripes on awning ducks instead of dyeing the yarns and then weaving. Could you possibly put us in touch with the owners of this process? (5698)

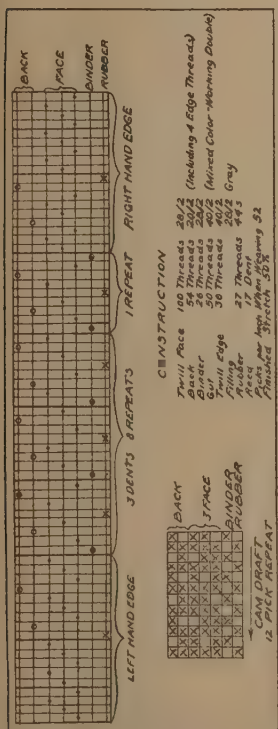
Some time ago these awning stripes were simply painted on cloth by stretching the piece on a long table and using a straight edge for lining up. They were painted with oil and pigment colors. That old method, similar to hand painting, has been discarded, and printing machines have been adopted for doing this work by the intaglio process, the same as on printing for other textiles.

At the present time there are half a dozen or more concerns printing these awning stripes; also hammock patterns and furniture covers, all using Rice, Barton & Fales textile printing machines. In order to increase the production, mills have mixed the pigment colors with a varnish and used a thinning liquid for reducing it to the right consistency.

The engraving is naturally quite deep in order to hold the color. The goods are not prepared, although they are

sometimes dampened a little before the printing, to avoid the color going clear through. The process is not owned by anyone. It is simply an intaglio printing proposition by the use of varnish and pigment colors.

Construction of Edge for Elastic Web



We would like to know how to obtain an edge as shown by the enclosed sample of web. What we would like to have established is the number of ends and size of yarn used in the edge warp, as well as a drawing-in and cam motion chart. Your opinion would be highly appreciated.

(5688)

The sample submitted is a three-leaf twill face and plain back, with the face drawn four threads to the dent, as shown in the draft diagram, making a repeat covering three dents. The edge is drawn in on the face and back harness. The two threads on the back harness on either side of the edge are run from the back warp, being of the same weave and take-up, making 34 threads in all; while the twill part of the edge is run from a separate warp, being of finer stock than the face itself. The rubber is very fine, gauging 44s, and has been woven in under high tension, even to the chafing point; while the picking is somewhat open, being about

52 per inch. The finishing has doubtless been done under

heavy steam conditions, so as to get the full benefit of liberal shrinkage. Such goods should not be subjected to immersion when finishing, but the sizing should be applied to the back of the goods only.

Odd yarns of varied colors have been used for the gut, probably to work off such material, but if regular yarn is used, one thread of 20/2 would be equivalent to the two threads of 40/2 and more economical.

System for Payment of Silk Weavers

We wish to get away from a system we have followed ever since this mill commenced operations. We are running some crepe warps 1400 yds. long. We fill out a white coupon which is hung onto the loom. This represents 100 yds. of cloth, and the weaver turns this in when he has woven and cut 100 yds. from the loom. It is numbered up to 14, each section covering the hundred yards. This accompanies the cloth to the measuring and finishing department. As the warp is being beamed we put into it every twenty yards a manila coupon, one for every twenty yds., or seventy for a 14 piece warp. These come up every twenty yards, as the warp ends unfold off the beam. At the end of the week the warper writes his name on these and turns them in and the payroll is accordingly made up, so many tickets for each weaver, at say \$1.50 per ticket.

This system has worked all right, but for the last six months we have run a night force. To avoid mix-ups and apportion to each weaver what he has woven, we are obliged to carefully measure each hundred yard piece right down to the eighth of a yard. Also the set of weavers, the day and night operators, cannot turn in their five day tickets until the hundred yard piece comes from the loom. We have just installed pick counters on the box looms but we are not ready to turn them loose. Anyhow, there must be other and better systems in vogue than ours, and we thought possibly you could suggest one. We think burying the tickets in the warp is an obsolete method and we should like to install something more modern. Can you help us out?
(5751)

The pick counter method is the most practical for the purpose. A silk manufacturer states that the only other method he could suggest would be to use small white tags on a string; these to be woven in the selvage and the respective

weavers to write their names on the tags. When the piece comes from the loom the yardage can be tabulated. There is no better method than using the pick counters, and would suggest that these be put into use as soon as possible.

Kier Boiling Cotton Cloth

I wish you would give me a good compound for kier boiling cloth. We are using a single boil. Cloth is plain weave and three harness twill. We have been boiling 10 hrs. We have been using 3% caustic, 2% soda ash, and 1% silicate of soda. All goods are napped. Are there any better chemicals to use for a better boil-out? (5672)

There is a decided difference of opinion among bleachers as to the best compound to use in kier boiling. Many bleachers use nothing but caustic soda; others prefer a formula similar to that used by the inquirer, and still others advocate the addition of either Turkey red oil or soap to the kier liquor. As there is no standard practice in kier boiling, if satisfactory results are being obtained under the present method, there is no advantage to be gained by changing. It seems probable, however, that in this case it might be advisable to increase the amount of caustic to 5%, leaving the quantities of soda ash and silicate as they are at present. Thorough washing of the goods in the kier with hot water immediately after blowing-off the spent liquor is also recommended to insure a good bleach.

Bleaching Woolen Yarns with Sodium Bisulphite

Will you please give me what you consider to be the best formula for bleaching woolen yarns with the bisulphite soda process? (5756)

The principle methods used for the bleaching of woolen yarns are the peroxide bleach and the sulphur (fumes of burning sulphur) bleach. Sodium bisulphite may be used, but due to the fact that the workmen have to stand over the tub and work the skeins on sticks, they will find it very disagreeable on account of the sulphur dioxide fumes liberated. The procedure is as follows:

Scour the skeins thoroughly, using a neutral fig soap with the addition of a small amount of ammonia; rinse thoroughly

until there is no trace of soap left in the yarn; hydro-extract. Prepare the bisulphite solution in a wooden vat containing no metal, dissolving 4 lbs. of the sodium bisulphite to every 100 gals. of cold water used. In an adjoining wooden tank (with no metal parts), add $6\frac{1}{2}$ lbs. of hydrochloric acid to every 100 gals. of cold water; mix thoroughly.

Work the previously scoured, rinsed and extracted yarn in the bisulphite liquor for 30 min. Raise the skeins so that the liquor will drain back into the vat; allow to drain 5 min.; then work in the acid vat for 15 min. If the fumes liberated are too strong for the workmen, instead of working the skeins in the acid, let them submerge. After 15 min. raise and drain; then work them for another 15 min. in the first vat, containing the bisulphite of soda. Give one cold water rinse.

Another method in use is to neutralize the sodium bisulphite with hydrochloric acid. Saturate the skeins in this liquor and then subject the yarn to dry steam. This latter method is better applied to piece goods.

Loom Adjustments for Weaving Crepe de Chine and Crepe Satins

We are weaving crepe de chine and single-end crepe satins and are having considerable trouble with the warp ends breaking. I have noticed that the top shed of the warp, when closing, is very slack, causing some of the warp ends to stick together. Consequently, when the shuttle passes through, one or more ends are broken. This condition is more noticeable on the satin, although we have the same trouble with both fabrics. Both sheds of the warp are divided evenly and therefore we are at a loss to account for this and correct it. Can you give me any suggestion that may overcome this? Can you also tell me the correct timing of the loom for crepe de chine and crepe satin? It may be possible that the loom is timed either too late or too early.

(5760)

The reason for the top shed of the warp being slack in the satin is due to the whip-roll being too high. Satins should be woven with the whip-roll 1 in. lower than the breast beam. On crepe de chine, the whip-roll should be set so that the ends, when the sheds are changing, are straight in line with the breast beam in center of reed; or

in other words, by running a string from breast beam to whip-roll it should be level.

In the setting of crepe de chine, the lay should be on the front center when the harnesses are changing; and on satin crepe the lay should be $\frac{1}{2}$ to 1 in. from the cloth when the harnesses change.

The writer would recommend that all the weight possible be put on the warps during weaving, as the heavier the warp is weighted the better the piece of cloth looks. Crepe satins cannot stand as much weight as crepe de chine.

Misplating on Hosiery

As a result of your reply to Question and Answer No. 5659, which places the blame for a difference in ribbed tops on the rayon used, the knitters have come back at us with a strong complaint on the quality of the yarn. We have several samples of complete hosiery which indicate the trouble that the knitter has really had difficulty with. We are forwarding herewith a sample half hose in brown, and a sample of another piece with green tinted yarn. We have shown this stocking to a number of knitters and they describe the fault as misplating due to wrong tension. It is believed that too great tension would pull the rayon against the throat of the needle and break certain of the filaments, giving the damaged portion that fuzzy appearance which the rest of the stocking lacks. This belief is supported by the fact that the undamaged portion of the stocking is wider and more easily expanded than the damaged portion which feels slightly stiff when an effort is made to pull it out. The damage does not begin at any regular distance from the ribbed top. In some cases it begins an inch from the top, and in other cases two inches or more. The machines are an old model, 144 needle. The knitters made 50 doz. half hose in all, of which 5 doz. showed damage similar to the sample attached. The yarn used is as follows: For ribbed top, 10s single cotton plated with 100 denier rayon; the boot is 12s single cotton plated with 100 denier rayon. This rayon is supplied with 17 filaments. This fact makes us wonder how you reached the count of 18 filaments on one strand taken from the sample with Question and Answer No. 5659, and 16 filaments from the other.

The green sample sent herewith is merely offered in the event that the green samples you have may be a tinted yarn, the dye being intentionally fugitive for washing out easily, and its sole purpose of course being to check the plating.

This tinted yarn may vary considerably in depth of color but this makes no difference because of the purposes to which it is put.

We are very anxious to have you pass judgment on the brown half hose enclosed, and give us your opinion on the reasons for the damage. (5686)

The answer to inquiry No. 5659 was based on the findings from an analysis of a series of rib cuffs submitted. The real trouble seemed to be with the coloring, although everything seemed to conspire to produce the particular effect obtained. If this coloring is to be washed out, the greatest difference is eliminated.

The last paragraph of the previous answer discussed a possible explanation for cutting the yarn. Machine troubles might have been responsible but as the previous material was satisfactory, it seemed more likely that the trouble was due to change in yarns.

The brown stocking enclosed is an entirely different proposition. The trouble here comes in a plain fabric (rather than a rib), made on an entirely different type of machine. Without doubt, this trouble is misplating. It is not possible to check on the size of rayon, as it is broken to such a considerable extent and a count of the filaments cannot be especially depended on where the breaks are so close together.

In looking for the cause of this trouble, we unravelled some of the foot. There seems to be a sort of repeat in the breaks in the rayon yarns. By unravelling, an unbroken length of from 9 to 18 in. was obtained, followed by a series of short lengths. After considerable unravelling, it seemed that these longer lengths repeated about every 30 in.

These facts would lead us to believe that these breaks may result from some winding trouble. There may be knots on the surface of the bobbin, rough spots on the bobbins or at the ends of paper cones, or soft places where one layer has pulled into the preceding layers. Tension troubles from other causes about the machine may cause this, but as the upper part is satisfactory, it seems as though the machine must be correctly adjusted.

Luster on Spun Silk Knitted Cloth

Can you inform me how I can overcome the following trouble: In washing silk knitted cloth (spun silk) we wash it with a fig soap in warm water for 20 min., then rinse for 20 min. in warm water. One lot will come out all right and the other will come out dead with no luster and a poor handle. Can you tell me if we are using the right soap? All we want to get is the oils and gums out, so it will look clean. (5761)

A true fig soap is made from olive oil foots by saponifying with caustic potash. Usually a small amount of tallow is added. It should be as nearly neutral as possible and unless there is an excess of free alkali, this soap can be used on spun silk with excellent results.

In treating spun silk make certain that the soap is thoroughly washed out before drying, as any soap remaining in the material will tend to deaden the luster. However, your difficulty is probably in the silk itself. One shipment may vary from the next, and where the silk has gone through some previous treatment, the luster will be impaired. The luster of the fiber in damaged cocoons is also not as great as in healthy ones. In treating spun silk, it is always advisable not to use a high temperature.

There are preparations on the market which can be used on this class of material for giving an increased luster and mellow handle. The leading manufacturers of processing oils can give you a suitable product.

Construction of Cotton Atlas Cloth

We are enclosing a sample of cotton glove fabric which we would like to duplicate. Will you kindly advise us if this is made on a 28-gauge tricot machine with the regular 96 motion atlas weave? If it is possible we would like to have you estimate the size of yarn that is used and the quality at which this cloth is woven. In order to complete this analysis, we would also like to know if the finished article has been shrunk and napped. We regret that we have no larger sample of this cloth to send you, but in the event that you do not have enough cloth for your report we will try to get some more for you. (5739)

Parts of the above question are difficult to answer definitely, but it may be safely stated that the cloth was made

on the regulation 28-gauge two-bar tricot machine with t. 96-needle traverse. It is not easy to pick out a long enough piece of the yarn to classify it definitely as to size, but it appears to be about an 80/1 glove yarn of a fairly good grade. To determine the exact quality it would be necessary to know the machine it was made on, as well as the width it was knitted and the width it was finished. Judging from the stretch, it was finished about two-thirds of the knitted width, say 96 in. from a 144-in. machine. In this case the quality would be represented by a rack length of $5\frac{1}{2}$ to 6 in.

If the cloth has been shrunk at all it has been done very slightly. Chemical tests show no trace of the shrinking process and we are inclined to think that it was not shrunk at all; at least not enough to signify. It appears, however, to have been subjected to a slight brushing as there is a suggestion of a nap when compared with similar goods. In any case the degree of napping is so slight as to be hardly worth considering. It is difficult to satisfactorily nap such cloth without first thoroughly shrinking it.

Shrinkage of Knit Fabric

We enclose herewith a sample of knit fabric with which we have experienced considerable trouble on account of shrinkage. You will note that this fabric is two-ply knit together and is a very soft fabric. We have been treating this fabric in the following manner: Scoured for 30 min. and washed off; then treated with 2 pailfuls of chloride bleach per 100 lbs. of cloth, and 1 gal. of muriatic acid, run 7 min., and washed off; followed by $1\frac{1}{2}\%$ of bisulphite soda, run 20 min., washed off in three waters. If you could give us any information for overcoming this shrinkage, we shall appreciate it. (5757)

The fabric consists of a woolen outer ply and a cotton inner ply. The chlorine treatment is no doubt given to render the material unshrinkable as the chlorination of wool does prevent shrinking to a certain extent. The action actually is one of oxidation and causes the wool fiber scales to fuse together more or less, thus reducing the tendency towards felting.

From the inquiry it is not clear whether the shrinkage complained of occurs during the treatment or after the garments are laundered. Some shrinkage must be expected

during the processing from the action of the chlorine on the wool, but not to a very high degree. If a reel machine is used, make certain that the fabric is run with no tension and, in fact, the squeeze rolls should be raised so that the pulling is confined to a minimum. In the final rinses it will probably be necessary to use the squeeze rolls.

Should the shrinkage occur after the garments are laundered, scour the material for one hour previous to the chlorine treatment; rinse well and treat as you have been doing. (For the amount of chlorine liquor used, it should test at least 4% available chlorine.) It is also suggested that the chlorine liquor and acid be added in several portions, rather than all at one time, and that a soaping be given after the bisulphite has been thoroughly washed out. To the final soaping add 1% soda ash. This should be followed by another thorough rinsing.

The construction of the fabric is also conducive to shrinkage. With the mild scour given, the inner ply of cotton will still retain much of its natural oil, waxes and foreign matter, and when a harsher treatment is given in the laundry, these oils, waxes and foreign bodies are removed, causing the cotton to shrink noticeably. Should the inner ply of cotton shrink, it is apparent that the outer woolen ply will follow.

Softening Cotton, Rayon and Silk Hosiery

Will you kindly give us any information you may have at your disposal regarding softening of hosiery made of cotton, rayon and pure silk? Our hosiery is made on a 240-needle machine, and is composed of 150 denier, grade A, twenty-four filament viscose, and three ends of pure silk. Our trouble is that the stocking after it is finished has a hard "boardy" feel instead of the soft silky feel desired. We have tried olive oil and sulphonated castor oil softeners up to 5%.
(5677)

The softening of hosiery such as you describe should not be difficult. The use of olive oil soap rather than a high percentage of sulphonated oils may give better results. The writer's recommendation would be as follows: Use 5 to 7% by weight of a good grade of olive oil soap and 1% of a sulphonated castor oil. There are numerous good products on the market in the line of softeners made up of tallows,

soaps and oils. The temperature of your softening bath should be around 110 deg. F. A small amount of glycerine added to the finishing bath would have a softening effect on the grade of hosiery you are making, but its use is not general.

Discharge Printing of Golf Hose

We are enclosing herewith a piece of boys' golf hose and would ask you to kindly advise what process is used to do this discharge printing. You will note that the blue random yarn seems to have been a very weak dye of the gray and white, which seems to be a fast color, and that the gray solid stripe seems to have been a dye that can be discharged. We have an idea that same is done with hydrosulphite, but we are not sure. Any information you can give us will be very much appreciated. (5733)

In order to obtain this effect, it seems (without making chemical tests) that the hose was made by first dyeing the loose stock two shades of gray; that which was twisted with the white yarn being dyed with a small percentage of such a product as sulphur black, which is not affected by a hydrosulphite discharge; and that of the solid gray part being dyed with a small percentage of direct black or some similar product which can be discharged with hydrosulphite. After the gray and white yarns were twisted together, they were probably dyed with some such color as Niagara Sky Blue 6B, a bright direct cotton blue dischargeable with hydrosulphite along with the gray obtained from the use of direct black. The hose were then knit, and printed with a hydrosulphite discharge. After printing, age for 5 min. at 215 deg. F., and wash in cold water.

Long Chain Quilling

I would like some information on long chain quilling. What is a fair production for 10 hrs. on a 378 spindle, Model A, Whitin quiller on 14s yarn? What piece work rate is paid, North and South? We have one quiller that was moved South from the northern mill when this dye-house was built. We have not needed it until now. I have started it and am doing very well with it, but would like to have something to compare with. I am not a dressing room man, but have to run the beaming and warping as well as the dyehouse at this place. (5704)

Between 8,000 and 10,000 yds. would be a fair production on 14s yarn for a 10 hr. day. The production, of course, would be affected by the speed of the machine, the speed of the operator when doffing, the size of the bobbin, and the quality of the yarn. In the catalog of the Whitin Machine Works, it is stated that a fair average production is 300 lbs. per 10 hr. day, which is approximately equivalent to the yardage production given above.

The piece work rate for this kind of work varies in different mills and localities, but we find it is generally about the same weekly average as a long chain beamer. In the northern mills, the rates generally are from 54c to 60c per thousand yards, and we might add that this work is mostly done by women.

The inquirer being a novice in this branch of the business may find it helpful if we mention a few of the most important things about these machines that he must keep in constant touch with. When oiling spindles, often put a few drops in the cups. Do not put too much on at a time as the excess oil will work on to the whirl and be thrown on the yarn by the speed of the spindle. The machine should be cleaned frequently. Lift rods should be kept clean and well oiled; they get stuck very easily.

The felt washers under the cups must be free from dirt or waste and the worn ones must be replaced by new ones frequently, or soft bobbins and broken ends will be the result. The waste on the cups should not be allowed to get too large before being cut off. Bands must be kept fairly tight. Guide wires should be examined often, as worn guide wires cause a great many broken ends and retard the production. Broken cups, or cups with pins out, where pins are used, cause a great deal of trouble to the operator.

The rubber roll on top of the machine should always be kept well covered with a layer of fine lightweight felt flannel. The roll must not be too heavy. Sometimes it helps the yarn a great deal to lift this roll a little by putting small bits of leather under the ends to raise it. Make sure all bobbins are properly set on cups before starting up the machine after doffing. It will more than save the time it takes to do this in getting started again.

Have leases put in the chains so that there will be just enough yards between leases to fill a bobbin. This will give the operator a chance to straighten out all crossed ends

before doffing, and she can keep her attention on the bobbins when starting up the next doff. The builder-motion is very important. See that it is always in good working order. Make a good even bobbin, not too hard. Be sure that each layer goes up the bobbin just a little higher than the preceding one. Make doubly sure that the pick-arm is set so that the bobbins will not have soft noses and peel off at the weaving. Get all the length you can on the bobbin; the more yards on the bobbin the longer the loom will run. The more time and care you put into this part of the work the better will be your weave room production.

Available Chlorine Determination

Could you help me out in an available chlorine determination? A big tank is filled with water and to it a tube of chlorine gas is added; also some caustic soda and soda ash. These two substances hold the chlorine in the water. If you take 50 cc. of the above solution and titrate with N/10 sodium thiosulphate solution, you use 25cc. of same. Please figure per cent available chlorine. (5744)

In the determination of available chlorine by the thio-sulphate method each cc. of N/10 sodium thiosulphate used is equivalent to .00355 g. of chlorine. In the example given, 50 cc. of the bleach liquor required 25cc. of the reagent. Multiplying .00355 g. by 25 gives .08875 g., which is the amount of available chlorine in the 50 cc. Dividing this figure by 50 we get .001775 g., which is the amount of available chlorine in 1 cc. of the liquor. The percentage of available chlorine is therefore a little less than two-tenths of 1%.

Dyeing Logwood on Silk

Can you oblige us with a brief outline of a method for dyeing silk black by means of the Logwood process, including the proportions of chemicals to use, etc.? We shall greatly appreciate this information. (5758)

The inquiry does not state whether a method for dyeing skein silk or a method for piece goods is desired, so a brief statement for both will be given.

Boil-Off. Whether silk piece goods or skein silk is used, it will be necessary to first remove the silk gum. For piece

goods, it will be necessary to place the goods in a bath made of water and 30% of a good neutral olive oil soap, calculated on the weight of the piece goods. Pieces should be entered when the temperature of the bath is at the boiling point, and the pieces kept moving for two hours with the heat just below the boiling point. For skein silk, the amount of the soap used is the same as for piece goods, but the time should be lengthened. Fine silk, such as organzine and tram, may be boiled-off in two hours, but coarser threads, like a five or seven thread sewing silk, will require three to four hours. After the degumming process is completed, the silk should be given four hot waters to remove the soap and gum and then given a cold water.

Method 1. The one bath process for dyeing Logwood on silk is as follows: Prepare a bath containing 40% Hematine Paste and 30% Fustic Extract; enter the silk and work slowly, turning on the steam and running the temperature to 140 deg. F. Work fifteen minutes at this temperature and then lay up the material. Add 4% Copperas and 1% Bluestone, enter the goods, and work while bringing the temperature up to the boil. Boil for half an hour and then match up. Rinse well in warm water and brighten in an olive oil soap bath containing 10% to 20% olive oil soap; then rinse.

Method 2. Place the silk, either skein or piece goods, in a bath of so-called "Nitrate of Iron" or "Red Iron Liquor," cold and of 20 deg. Be. strength. Work the silk in this liquor for one hour. Take out and rinse in five changes of cold water. Then give one hot (135 deg. F.) water to set the iron.

Prepare a bath containing 25% Fustic Extract and work for half an hour at 150 deg. F. Lay up the silk and raise the temperature of the bath to the boil. Enter the silk again and work again for half an hour. Rinse in two warm waters and then make up a bath containing 25% to 35% Hematine Paste and 25% olive oil soap. Start working the silk at 140 deg. F. and continue for half an hour. Raise the temperature to 160 deg. F. and work another half hour; then match up. After dyeing, the silk should be well rinsed in three warm waters and brightened with acetic acid (2%) cold. The addition of a teacupful of olive oil emulsion to 50 lbs of silk, will tend to intensify the shade of the black.

Method 3. This last method not only gives a beautiful shade of black but also increases the weight of the goods considerably. The silk, either skeins or piece goods, are mordanted as in Method 2, with Red Iron at 20 deg. Be., cold, for one hour; then washed in five changes of cold water and one hot (135 deg. F.) water, to "set" the iron. A bath containing 20% Fustic Extract and 100% Gambier Extract is made up and the silk entered at 120 deg. F. Work half an hour at 120 deg., then raise to 170 deg. and work another half hour. Bring to the boil and work slowly for one hour, allowing the bath to cool down. The silk should now be well washed with two warm waters and one cold water. Next enter into a bath made up with 30% Hematine Paste and 30% olive oil soap. Work half an hour at 130 deg. F., then heat to 155 deg. F., and work another half hour. The temperature should not be made much hotter as it destroys the bloom of the black. When finished dyeing, rinse in two warm waters and brighten with 2% acetic acid and a teacupful of olive oil emulsion (for each 50 lbs. of silk).

Storing Wool Hosiery to Prevent Damage from Moths

Will you please advise me how wool hosiery, both finished and not finished, should be stored during summer months, so as to be free from danger of moths? (5675)

The method of storing wool hosiery that is employed by one mill, which has been fairly successful for the last forty years, is to store the goods in wooden bins, or rather on wide wooden shelves in their stock room. This hosiery is sprinkled liberally with naphthalene, or other moth preventative. They try not to pile up the hosiery clear to the back of the shelves so that the naphthalene can get all around the goods. Whenever they shut down for more than over Sunday, they sprinkle the aisles between the shelves liberally with the moth preventative. While this will not afford absolute protection, their loss from moth-eaten goods is negligible.

A mill making wool underwear replies to this question as follows: We have had no experience with hosiery, but we believe that the method which we are using to protect our worsted yarn and worsted cloth will be equally helpful to

you in protecting your wool hosiery, both finished and not finished, from moths. Insofar as possible, we keep our worsted yarn in as nearly air-tight cases as we can, and we sprinkle one or two handfuls of camphor flake into each case. In the case of our worsted cloth, we use camphor flake also, and we frequently move the cloth about.

Speck Dyeing Woolen Goods Containing Cotton and Viscose

We have a problem of improving the results obtained in speck dyeing woolen goods manufactured from wool shoddy which contains small particles of cotton and viscose rayon. The speck dyeing is at present being done in the fulling mill, but satisfactory results are not secured. Bearing in mind the fact that combination baths are used for dyeing mixed cotton and silk goods such as hosiery, we wish to know whether or not it would be practical to combine with the dye used on the stripped shoddy, a small quantity of dye suitable for covering the cotton and viscose rayon. (5700)

We take it you are dyeing the shoddy in the raw stock form and weaving it up into piece goods and speck dying in the fulling mill to cover the cotton specks, etc. We would not recommend speck dyeing in the fulling mill, for most of your speck dye will come off when the goods are scoured in the scouring machine. We suggest speck dyeing in the washer, after the goods are scoured, with cotton colors to cover the cotton and viscose specks. This can be done by running the goods at a temperature around 70 deg. F., with dyestuffs that will produce a speck dye similar to the body shade of the pieces.

In making up the bath for speck dyeing, use 20% common salt and 2% soda ash, on the weight of the goods. The common salt drives the cotton colors on to the specks and the soda ash helps to keep the wool from taking on the dyestuff.

It is difficult for us to tell you just what dyestuffs to use and the amounts. If you could send swatches of your different shades to the dyestuff dealers they could send you formulas to go by. In case your washers are busy, you can speck dye the goods in the dye kettle. By doing it this way it saves the washer from becoming dirty for white

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goods. There are some goods that are dyed in the fulling mills, but we do not think this is what you are doing.

Where you are dyeing the wool shoddy in the raw stock form, using chrome colors, etc., you cannot very well use cotton colors at the same time to cover the specks. The bath being in an acid condition causes all the cotton colors to go on the wool, leaving the specks very light. Wool has a strong affinity for cotton colors when dyed in an acid bath, while cotton has very little affinity.

Recombing Tops

Will you kindly give us a little information with regard to recombining. We dye a lot of tops and would like to recomb same. The qualities are from 44s to 60s. Would we require two sets of circles for Noble comb to do this kind of work? Also state number of pins per inch that you think would give best results. (5755)

Two sets of circles will be required to recomb tops ranging from 44s to 60s qualities. Some mills do not recomb the coarser qualities when top dyed. In some cases even 56s are not recombed. This applies to dyed tops intended for the Bradford system. It should not be necessary to recomb any tops when dyed for the French system. However, the majority of mills do not believe in taking any chances and so recomb all their top dyes. Particulars for circles requested follow:

54s to 60s

LARGE CIRCLE

Row	Pins Per Inch	Size Wire
1	36	17x26
2	36	17x26
3	34	18x25
4	24	22
5	24	22
6	20	21
7	18	19
8	16	18
9	16	18

SMALL CIRCLE

1	.....	40	17x27
2	.....	40	17x27
3	.....	35	18x25
4	.....	24	22
5	.....	20	20
6	.....	20	20

		Large Circle	Small Circle
Setover	.....	2 $\frac{1}{8}$ in.	$\frac{5}{8}$ in.
Width of Brass Rim...	2	13/16 in.	1 13/16 in.
Thickness of Brass Rim		7/16 in.	7/16 in.
Length of Pin.....	1	$\frac{5}{8}$ in.	1 $\frac{1}{2}$ in.

44s to 50s

LARGE CIRCLE

Row		Pins per Inch	Size Wire
1	.....	26	18x23
2	.....	26	18x23
3	.....	24	15x22
4	.....	22	21
5	.....	20	20
6	.....	18	19
7	.....	18	19
8	.....	16	18
9	.....	12	17

SMALL CIRCLE

1	.....	30	16x24
2	.....	30	16x24
3	.....	25	18x23
4	.....	22	21
5	.....	20	20
6	.....	18	19

		Large Circle	Small Circle
Setover	.....	2 $\frac{5}{8}$ in.	$\frac{5}{8}$ in.
Width of Brass Rim...	3	$\frac{1}{4}$ in.	1 13/16 in.
Thickness of Brass Rim		7/16 in.	7/16 in.
Length of Pin.....	1	$\frac{3}{4}$ in.	1 $\frac{3}{4}$ in.

Creases in Black Satin—Tight Edges on Cloth

(1) We are enclosing a black satin. You will notice that the face shows sharp creases. Can you tell us the cause of them? We might mention that in the gray goods there are no creases whatever, and they must be done somewhere in the dyeing. We would like to go to the bottom of this.

(2) We have had some trouble with tight edges in satins. We are using a 20/22 raw, running the edge right off the beam. In your opinion, would it get somewhat slacker by using boiled-off organzine instead of 20/22 raw, and running it from the beam also? (5782)

(1) Creases in the black satin are caused in the finishing or the piece has not been folded properly after finishing. We would suggest that the inquirer take this up with the finisher.

(2) Regarding the trouble with the edges on satins, it is noted that the inquirer is running the edge right off the warp beam. This practice is opposite in the weaving of tape edges, as these edges should be made on separate anchor bobbins, due to the fact that the take-up on the edge is different from the take-up on the warp. Changing from 20/22 raw to boiled-off will not help this condition, although the boiled-off organzine is better adapted for edges than 20/22 raw, as there is less end breakage and it gives a cleaner edge.

Softer Finish on Weighted Glove Fabrics

We have been very much interested in the questions submitted to you and the answers. We believe that you could possibly give us some enlightenment on the proper procedure to secure a softer finish on tin-weighted glove silk fabrics, both tricot and milanese. Our experience has been that we cannot entirely eliminate the harsh feel which tin-weighted cloth acquires. Also we sometimes have difficulty in properly matching the shades, as we find the colors bleeding when immersed in the finishing bath, thereby resulting in paler shades than the color desired. We would greatly appreciate any information which you can give us on this. (5722)

It is difficult to answer the question without first seeing the goods in question and knowing the processes used in detail, as well as the chemicals employed. It is difficult to

eliminate all the harshness. After about an 18/20 weighting, it is practically impossible to disguise the changed condition of the fibers in this particular type of fabric. However, the harshness may be due in part to incomplete rinsing between processes, with the result that residual sodium silicate may cause the trouble. The writer has found harshness to be mitigated somewhat by giving the goods an additional stretch on the dressing frame after they have become dry. It is also possible that the addition of a small amount of a monopole or similar oil in the last bath might assist.

In the matter of shades, this would appear to lie in the dyestuffs being used and nothing better could be done than to consult a reliable dyestuff concern whose special business is to advise the best dyes for a specific job. The use of acetic acid in the rinse might help and it is certainly advisable not to dye the goods too fast, but to bring them up to full shade with gradual addition of the dyestuff. It is surprising what difficulties may be overcome by slower dyeing, and the use of the right colors for the purpose.

A silk dyer replies to this question as follows: The harsh feel of the cloth after dyeing may be due to improper boil-off, or use of too much acid in the dyeing liquor if acid dyes are used, or too much salt if direct dyes are used. Properly tin-weighted silk cloth should not feel harsh and the trouble may be due to methods used in the tin shop procedure.

If the dyes bleed off in the finishing bath, they are not fast enough and a change should be made in the type of dye used. Definite instructions cannot be given unless present methods and dyes used are stated.

Removing Silk Gum from Felt

We would appreciate it if you could inform us about the following: We use felt to run our silk through and the felt assimilates a great quantity of gum from the silk. What can we use to boil these felts out so that we can eliminate the gum without injuring the felts? (5689)

An olive oil soap would wash the gum from the felt without very much difficulty. The addition of a small amount of sulphonated castor oil would also be helpful.

Causes of Spots on Silk Stockings

We enclose a sample of a thread silk stocking which you will observe is spotted in the leg with small brown spots. As we have run into this trouble recently, we have been examining the goods after the boil-off, and in this case they were found to be perfectly clean. The spots appeared after dyeing. Can you advise us what is causing this trouble?

(5726)

The spots appear to be grease spots, as from a dirty machine. We would suggest an occasional thorough boiling-out of the machine. Dyes will sometimes leave a deposit on the sides of the machine, particularly where hard water is used, and this is very difficult to move, once it has settled on the goods. The writer once experienced this trouble, which was finally traced to the steam pipe in the dyeing machine which emitted drops of oil or grease, and these floating on the surface of the liquor were picked up by the goods.

Bleaching and Finishing Rayon and Cotton Mixed Goods

Can you give me information on the finishing of artificial silk and cotton goods? We sincerely hope that you may be in a position to advise of the various processes on this grade of mixed goods.

(5719)

This is a very broad question to attempt to cover, due to the fact that information is not given as regards the particular line of fabrics which the inquirer has in mind. At the present time, artificial silk and cotton goods are being made in a wide variety of fabrics. In some cases the artificial silk is used only as a decorative feature in stripes or checks, and occasionally it is used in figured goods. On the other hand, a great many fabrics such as draperies, dress goods and linings are being made with a cotton warp and rayon or artificial silk filling.

It is a well recognized fact that the most difficult goods to handle are those which contain artificial silk in the warp, and which have to be processed in the way of bleaching or preparing in a wet condition. In such cases, it is customary to use bleaching or washing equipment, especially constructed, so that the goods will not be subject to too

much tension warpwise while the artificial silk is in a wet condition, on account of its not having so much tensile strength when wet.

As an illustration, we would give the following information: The fabrics as above specified should be washed in the rope or strand form only in slack washers, and if washed in the open width, open washing machines should be fitted with roller or ball bearings on the immersion and carrier rolls.

Some concerns have found that it is more convenient to bleach goods which require a full white bleach through the medium of the so-called Bennett kier. This kier is nothing more or less than a cylindrical shaped wooden tank holding about 25,000 yds. of goods, weighing on the average 5 to 7 yds. per pound. Goods are boiled in the same way and manner as they would be boiled in a pressure kier.

Bleaching is accomplished through the use of a circulating pump and a closed heating coil under the false bottom of the kier. It is possible to use boiling-off or bleaching liquors composed of the proper percentage of soda ash and soap, preferably somewhat weaker than are used on regular cotton goods, after which goods are washed down in the kier without moving, and through the means of the same pump that is used for circulating the boiling liquors, chlorine liquor is sprayed over the goods and they are allowed to lie sufficiently long to bleach and make white. After this they are treated with either weak sulphuric acid or bisulphite of soda liquor, washing being done with a pump between each process. The loading and unloading of the kier is accomplished by a slack type or dolly washer, without any tension on strands of cloth.

Goods can then be opened, preferably through a tower by hand, and squeezed over a light 2-roll mangle. It is possible of course to use a scutcher, if the scutcher is properly made and not run at too high a speed, where the artificial silk threads do not float on the face or are loosely woven.

The goods can then be dyed in regular dyeing padders or dye jigs fitted with ball or roller bearings on the immersion rolls.

The finishing of these goods is usually accomplished by the use of some sizing medium, made up especially for treating artificial silk fabrics, of such a nature that it is

transparent when dry, and eliminates the possibility of dulling the luster of the rayon. This finishing can be accomplished over a regular range of 2-roll padder or starch mangle, four to six drying cylinders, and a regular 90 ft. tenter with insulated housing and heating system. It is good policy not to attempt to dry the goods at too high a speed or with too high a temperature in the housing. In fact, the lower the temperature used for drying these goods on the tenter, the better will be the condition of the artificial silk.

After tentering, the goods can be slightly conditioned, the calendering being done on either a regular 3-roll silk finishing calender with two wool paper rolls and a middle chilled iron roll, heated by steam or gas, as preferred, to not more than 260 deg. F., or on a special 3-roll silk friction calender with a top chilled iron roll heated by gas or steam to 260 deg. F., middle wool paper roll and bottom cold dry sand iron roll.

For mellowing the finish, if necessary, a breaker may be used of either the well known silk button breaker type or spiral breaker. Certain lines of artificial silk fabrics for the drapery and upholstery trades are of course made from dyed yarns and all that is necessary on these is to simply dress them with a little sizing material over the tenter range specified, and then to calender them as recommended above, depending upon the amount of luster and finish necessary.

The writer has personally seen a great many bedspreads which could be calendered direct from the loom and sufficiently good results obtained to make them a high grade marketable product.

Weave for Cadet Cloth and Overcoatings

Will you kindly let me know a good weave for cadet cloth; also what weaves are used to produce overcoatings of the highest grade?
(5714)

The best weave for a cadet cloth depends upon the weight of fabric wanted. The weave should be tight enough to allow for a smooth finish without any form of twill being in evidence. A three-harness twill, 2 up and 1 down, is sometimes employed; also a four-leaf broken or Russian twill, 2 up and 2 down. This gives a level fabric. A five-harness doeskin, 3 up and 2 down, is sometimes used and

like the three-harness twill inclines to show the warp more on the face than on the back of the fabric.

Chinchilla weaves are largely employed for the highest class of overcoatings. To soften the construction and raise a well developed nap, there is a lively whipping operation before the goods are run through the chinchilla machine. Regular double cloth weaves, either the same for back and face, or different, are also employed for staple or novelty fabrics. A large variety is invariably produced by the leading mills.

Mercerizing Cotton Yarns

Will you kindly give me any information regarding the mercerization and boiling-out of cotton yarns? All information that you can send will be greatly appreciated.

(5709)

Apparently this inquiry refers to the mercerization of skein yarn, so the answer will be given on this basis. Boiling-out, unless the yarn is going into especially light colors or bleach, need only be a wetting-out, and any convenient method can be used as long as it is thorough. For small scale work it can even be done in hand tubs. Boiling in a closed kier is best, however, for skein yarns. The writer has had the best success with a small amount of soda ash, 3% on the goods, boiled for six hours at 7 lbs. steam pressure. The procedure may depend somewhat on the quality of the yarns and on the water, and it may be varied to suit the required volume of production. The yarn must come out thoroughly wet-out and uniform in color. It should then be whizzed thoroughly just before mercerizing and protected from drying-out. It is best to store it but a short time.

The skeins are beaten out straight and mounted on the machine according to the manufacturer's instructions. They should be put on straight, covering the poles of the machine uniformly and not overlapped to the extent of piling one on another.

The tension has to be regulated largely from experience, and will vary with different qualities and twists of yarn. A general rule for 54-in. skeins is to apply tension until on spanning the stretched skeins at the middle with the

hand, the sides can be pressed toward each other about half an inch each. If they can be pressed inward easily for more than half an inch they are too loose; or if a considerable pressure is required, they are probably too tight.

Mercerize for $3\frac{1}{2}$ min. in caustic at 50 to 56 deg. Tw., which is just under 25% strength. During the first part of the washing, the yarn will be observed to slack off, and it is customary to take up this length by the application of a little more tension. On some machines it is done automatically. Washing is continued until the caustic is quite thoroughly removed. Three minutes with warm water, about 140 deg., and three minutes cold, have been found to give good results. Possibly a little shorter time can be used, but caution should be used in cutting time or materials in any process.

The skeins are transferred to cold or slightly warm 3% sulphuric acid for souring, and then the acid is thoroughly washed out by three or four tubs of water. Softening is put in if desired and the yarn may be sent to subsequent processes wet; or it is dried, preferably at a moderate temperature.

In warp mercerizing the sequence is the same. The tension is supposed to be such that the yarn just about maintains its original length, not suffering any permanent contraction in the process. About a minute is allowed for the boiling-out in water or in water with soap, oil or alkaline assistants. About two minutes are allowed for mercerizing. The remarks on skein mercerizing apply in a general way, except as modified by difference in the machines.

It is recommended to consult the manufacturer for instructions which will apply to the specific type of machine in hand.

Calculating Percentage of Oil in Tops

Regarding oil tests on tops, I would be glad if you would kindly enlighten me concerning the same. Assume a length of top the original weight of which equals 100 grs. The dry weight is 90 grs., and after scouring the weight is 87 grs. The difference in weight between dry and scoured is 3 grs. Using the 100 grs. in conjunction with the 3 grs. gives 3%. Using the 90 grs. in conjunction with 3 grs. gives 3.3%. Which is the correct method and the one adopted in the trade?

(5712)

Neither is correct, according to the best practice. The percentage of oil should be based on the standard condition—that is, the dry weight (oil included) plus 15% regain. The fact that the original weight of your test sample was 100 grs. has no influence in computing the percentage of oil. You would first have to compute the weight of your test sample at standard condition; thus, $90 \times 1.15 = 103.5$ grs. at standard condition. $(3 \times 100) \div 103.5 = 2.89\%$ of oil in your sample. In making such a calculation it is necessary to remember that oiled top in standard condition contains 83.96% of bone dry wool, 13.04% of water, and 3% of oil.

Effect of Carbonizing on Strength and Fulling Capacity of Wool

We have two questions we would be glad to have you answer:

(1) How much is the tensile strength and fulling ability of $\frac{3}{8}$ s blood wool affected by carbonizing to remove vegetable matter?

(2) How much is the tensile strength and fulling ability of $\frac{3}{8}$ s blood wool affected by allowing it to lie for three months carbonized only, instead of immediately neutralizing? (5711)

It is generally acknowledged that the fulling capacity of any wool is somewhat reduced by carbonizing. However, standard authorities are not in agreement on this matter and one well known writer states as follows:

"In former years it was thought that the carbonizing process made the wool fiber harsh and brittle and seriously affected its spinning qualities. Therefore, wool in the stock was seldom carbonized if such a process could be avoided. It has been shown, however, that by properly conducting the modern methods of carbonizing the wool fiber does not become either harsh or brittle and loses none of its spinning qualities. In consequence, at the present time, a great deal of even the best classes of wool is carbonized in the stock before either carding or spinning, it being considered that this procedure will give better finished fabric in the long run than would be obtained by putting off the carbonizing process until after the pieces were woven and dyed. This also lays to rest the rather popular idea that the carbonizing process, in the preparation of extract shoddies, does great

injury to the fiber, and therefore that such wool is far lower in value than other forms of wool. Extract wools are no more injured relatively by the carbonizing process than are fleece wools, and therefore the acid treatment for the preparation of shoddy cannot be regarded as an injurious process."

Despite the above, practice generally bears out that a carbonized wool does not full as well as an uncarbonized wool of equal quality. To specifically answer the question is impossible, but an estimate can be made of from 10% to 20% reduction in fulling qualities. The tensile strength should not be affected, provided the carbonizing action by any method is properly carried out.

Answering question No. 2, it is customary when wool is carbonized by the aluminum chloride process to omit the neutralizing. Sometimes a wool may lie for a long period of time, over a year, containing a high percentage of acid, and it does not seem to harm it. For a period of three months we would not expect any great deterioration in tensile strength. The remnant of acid would not affect the fulling quality, as it is the entire carbonizing process which apparently reduces the fulling quality.

As general practice, however, it is strongly recommended that the wools be neutralized. In fact, there are some woollen industries which refuse to have anything to do with wools which have not been neutralized.

Chiffon Silk Hosiery

Will you kindly advise if women's 6-strand chiffon silk hosiery are being made successfully on circular knitting machines? If so, kindly state most suitable diameter, number of needles and gauge of machines. Also if women's chiffon silk hosiery can be made successfully on circular knitting machines, state whether they would be better with split foot or ordinary foot. Also advise what yarn is used in the tops, heels, soles and toes. (5716)

It is quite possible to make circular 6-strand chiffon stockings. As far as we know, 5-strand chiffons are more common but that does not mean that 6-strand stockings cannot be made. Stockings of this fineness can be made on machines of $3\frac{1}{4}$ and $3\frac{1}{2}$ in. diameter. The number of needles used may be 240, 260, 280 and 300. The larger

numbers of needles will give better texture stockings. The gauge of needles for these machines will be 48, 54, or 60, depending upon the diameter and the total number of needles.

Many of the circular chifions are made with the regular foot. We do not recollect seeing any split foot circular chifions.

Yarns for the top will generally be about 60/2 cotton and usually mercerized. Yarns for the heel and toe will average around 50/2 cotton or some combination, perhaps, like two ends of 90/2 or 100/2 mercerized. A common yarn for the splicing or reinforcing is 70/1, or perhaps 140/2 mercerized. A construction of this sort will give a stocking weighing about 1 lb. per dozen pairs when 5-strand silk is used. Since the proportion of silk is relatively low, increasing the silk by one strand will not vary the total weight much, not more than 5% probably.

Ring Effect on Hosiery

We are forwarding a sample pair of hose, in which on examination you will find a pronounced circular ring effect in the silk leg, the cause of which is unknown to us. It is claimed by some that it is a machine defect, and by others a yarn defect, caused by humidity conditions. We have at times detected the trouble on the machines and instantly changed the same cone to another machine and by so doing got a correct knit. On close examination you will notice that the ring effect is varied in each of the samples submitted. This may help to discover the trouble. We might also mention that this trouble at times becomes very pronounced and has caused us to put quite a lot of this style into second quality, which would otherwise have been in first quality. We would be pleased to have your valuable information in this regard. (5715)

The stocking showing the narrow bands or rings has the appearance of being knitted from yarn with an uneven tension. We can conceive of no knitting machine adjustment which could produce this effect in the stocking. It might be uneven yarns, but a band from uneven yarns is apt to be much wider and seldom occurs in any such regularity. When magnified, the bands appear to be due to a difference in stitch length, and as the ordinary stitch control cannot be held responsible for such variations, uneven yarn tension is the next likely factor. The stocking having the wide

bands shows the same texture variations which are seen in the stocking having the narrow bands. However, the bands are wider, especially those of the looser texture. This, then, is probably due to uneven yarn tensions.

Studying the second stocking more closely yields some additional evidence. If the bands are due to uneven yarns, they should follow the courses very definitely because yarn irregularities in this material will not be over short lengths but over long lengths. The bands do not follow the courses. While they seem to be horizontal, they really are at a slight angle and are spiralling around the stocking. Following the tight band from the top of the boot around the stocking leg, each time around advances the tight stitch section by one band. In this way, following the tight stitch band around the stocking it is quite apparent that the band is a spiral in form.

This is brought about by the uneven tension coming at a fairly regular interval. The ratio between the length of yarn used in one course and the length of yarn between tension variations happens to be just such as to bring the tight loops at slightly longer or shorter lengths than are required to make one course. The result is that the first tight loop comes just a little before or after the one in the previous course. A similar theory is explained in the answer to question No. 5660 in TEXTILE WORLD of Feb. 13, 1926.

The cause for the tension variation is most likely faulty winding. The first thing to look for would be knots, then cobwebs or throw-unders (if cones are used), then soft or spongy places in the yarn package where the strands of one layer are pulled into the preceding layers on the package, and finally roughness of cones or bobbins.

A knot placed anywhere on the surface from which the yarn is unwinding is likely to cause this uneven tension. Knots should be on the small ends of cones and on the outside of bottle bobbins below the level of the layer in which they belong. Cobwebs are most likely to break the yarn but sometimes do not. If yarn is pulled into the package due to heavier tension than that of the preceding layers, it will pull off harder than normal, but this is apt to affect longer lengths than are affected in this case. A rough spot on a cone or bottle bobbin may make much the same defect that a knot on the cone surface makes.

Finishing Heavily Napped Cotton Fabric

Enclosed please find a swatch of woolen cloth. Kindly inform me what processes are used in finishing and the machinery used? (5679)

Curtis & Marble Machine Co., Worcester, Mass., reply to this inquiry as follows: The heavily napped sample sent is not a woolen fabric. This is a cotton fabric "wool-napped;" that is, napped as a piece of wool fabric would be napped and the nap felted under so as to give a close firm face.

After the fabric is woven, the goods are steamed to soften them and then napped, finishing up with a felting napper to get the proper face. After napping there is practically no finishing required and the goods are then packaged; that is, folded, rolled or wound up for the market. We would state in regard to this sample that the face is covered very nicely indeed and the man in charge of the napping certainly knew how to get an even surface.

Trouble with Narrow Woven Tape Curling

You have been so good as to help the writer on two previous occasions that I am venturing to trouble you again in regard to a further difficulty with which I have to contend. I am enclosing a sample of tape, same being one of the lines manufactured by the concern I am with. You will notice its great tendency to curl. My employer has put it up to me to prevent this, our salesmen claiming that other concerns are putting out a similar tape which lies straight. (Our customers are threatening to switch their business unless we can overcome this trouble.) I shall greatly appreciate anything you might be able to suggest regarding this matter. I did get better results using a left-hand twist for the filling yarn, but this increased the cost of the tape (it is a very closely priced line), so I had to give that up. Also I tried softer twist in both warp and filling, but that caused trouble at the looms, owing to yarn breakage. We are at present putting our entire production through the finishing machine to flatten it out, but this is an extra operation and adds to the cost of the tape. (5706)

We believe the trouble complained of is caused entirely by the crowded condition of the warp threads as seen at either edge of the fabric. The character of the weave is

such that the loosely woven twill warp threads have little power of resistance against the filling which, pulling against these threads, crowds them together, making the tape heavier at the edges than it is in the center, and thus producing curling. A certain measure of relief may be had by using a short front reed, having a wide or deep dent, which will not spring so much when the filling nips the selvage. Such a reed will hold true to the required dentage, thus assisting the warp threads at the edges of the tape to better retain their proper position.

Another method would be to draw in a few of the outer warp threads a trifle coarser in the front reed than those in the center of the warp. A more effective method, however, is to have the outside warp thread operated to weave with a one up and one down movement, so that the filling will always bind on the same thread. This thread, preferably run double, and operating tighter on account of the more closely binding weave, should make an absolutely even selvage, and preventing the crowding together of the outside warp threads will prevent the curling complained about.

Another method is to use a very fine steel edge wire operated one up and one down instead of the outside threads already spoken of. This wire, withdrawn in the process of weaving, will leave a perfectly round and uniform edge, which improves the general appearance of the tape. Should a wire be used, it is advisable to have a hardened steel dent in the front reed, next inside the wire, so as to prolong the life of the dent. Such steel dents can be so fixed as to be easily removed when they become worn by the constant beat of the edge wire, and new ones inserted in their places.

Percentage of Sizing Material on Cotton

I should be very much obliged to you for information concerning the ascertaining of the percentage amount of sizing materials on cotton. I am wondering if there is some method which is recognized as standard in the United States. In Bean's work on sizing, a process is given which I should say gives results which are too high, and I do not know that this method is the one used in this country. If there is no standard method, let me trouble you to give me the one usually used.

(5690)

To our knowledge there is no recognized standard method for the complete analysis of sizing materials in cotton fabrics. We feel that the methods set forth in Bean's book, "Chemistry and Practice of Sizing," are sufficiently accurate for practical mill results.

We might also refer you to Matthew's book, "Application of Dyestuffs," page 691, on which will be found methods for estimating sizing and dressing materials in fabrics. By making use of these two books, you should be able to get sufficiently accurate results to cover the requirements.

Section Marks in Crepe de Chine

Can you give any information as to the cause of the warp section marks on the enclosed piece of silk? (5643)

The cloth submitted is a crepe de chine, $40\frac{1}{4}$ in. wide, which I calculate as being laid about $42\frac{1}{2}$ in. in the reed, and which is woven with a warp arrangement of 60/2/2 of raw silk, probably 20/22 denier, and with about 76 picks of crepe de chine twist, apparently three-thread. In other words, it is a pretty light fabric, in which any irregularities would show up clearly.

The defects complained of present themselves to the eye as darkish stripings about three-quarters of an inch wide, and repeating about every two and one-quarter inches in the fabric. Calculating the number of threads in this repeat, the number would about correspond with the number of bobbins that could be set up on the warping creel, and therefore they occur with each successive band, or section, of the warp as it is made.

A closer observation discloses the fact that these stripings are not of a different shade throughout their widths, but are due to an irregularity existing on each side of the three-quarter inch band for, roughly speaking, say $1/16$ of an inch. This can be readily proved by laying a very narrow tape, or narrow strip of white paper, over each edge of the striping, when it will be seen that the central part of it is just the same apparent color as the rest of the cloth. These occur most noticeably on one side of the cloth and taper off as they approach the other side, resolving themselves there into single stripings instead of double stripings, until they gradually disappear.

On observing the cloth against the light, the edgings referred to at these places will be found to show denser than the surrounding tissue. There are also some streaks through the goods where thin lines of a more open character occur.

Without having made a careful analysis to prove up with precision the size of the raw silk threads locally, the opinion of the writer is that these streaks are due entirely to irregularity in the size of the raw silk employed as warp. In the places complained of, it happens that groupings of rather thicker threads have occurred a short distance apart, and the cloth at these narrow stripings, presenting a thicker and denser, and consequently darker, aspect (when viewed in certain lights) suggests to the eye a darkness of stripe extending through the entire width between them. As band after band of the warp is made, the bobbins carrying these coarser threads will gradually become exhausted, and as one after the other is replaced by a new one carrying a thread of more regular size, the defect will gradually taper off until it disappears as already explained.

In viewing the cloth against the light, certain narrow stripings already referred to, of a thinner character will be revealed. This, of course, is only natural, for, if the yarn is so irregular that substantial amounts will run unduly coarse, it is to be expected that other portions of the material will run unduly fine, and hence there will be thinner stripings as well as thicker stripings.

If the inquirer wishes to determine for himself that this is the case, let him mark off with precision the center of one of these darker stripings, say for $1/16$ of an inch, and after cutting carefully into the cloth, remove the warp threads from this marked section, counting them carefully as this is done. Then cut similarly into the cloth in the part which is uniform in color. After removing and counting off exactly the same number of threads from this part, let him interloop this bunch with the bunch first secured, and then, after "cross twisting" them until each group is dense and set, and with all the "loftiness" out of it, let him view them against the light. I think that he will then find that the group that was taken from the dark edge of the stripe will appear bulkier to the eye than the group taken from the more regular part of the cloth.

JAMES CHITTICK

Seersucker Effect on Finished Rayon and Cotton Fabric

I am enclosing herewith sample of rayon and cotton goods woven 36 in. and finished 36 in. Would like to have some information as to what would be the best way to handle this fabric in the finishing department, as I find in finishing that it does not turn up very good. In fact, after softening and drying on the tenter, it comes up cockled. In other words, the rayon stands up stiff and the center falls in (as marked on sample) making it look cockled. After calendering I still get the same effect. Would be glad to have any information on this subject that you may be able to obtain.
(5701)

The fault shown can be laid to the fact that the rayon filling and warp are both woven under too much tension. If this fabric were made in plain color for finishing white and had to be bleached, the fault would have been more aggravated. In fact, the effect would have been that of a seersucker weave.

A great many weaving concerns have experienced this difficulty, and it is simply a question of getting the fine adjustment of tension on the rayon yarns. No amount of processing or calendering will eliminate this trouble. In fact, the writer is inclined to believe that the more processing given these goods the more aggravated will become the condition shown by the sample.

Souple Finish on Rayon

We are in possession of some foreign samples of the so-called souple finish upon artificial silk. These samples are very interesting from our standpoint due to the fact we have processed this class of material with a souple finish. This so-called souple finish, as you are aware, is reducing the luster of the artificial silk, which gives it very much the appearance of the pure product. We have devised several methods for producing this by the use of acids on low percentages. On seeing this foreign sample we are impressed with its finish and feel which far surpass the results obtained by the present domestic processes that have come to the writer's attention. We would appreciate having some information or a formula or two for souple finish. It might be possible that by being in possession of a number of ideas, we might work out a better product.
(5775)

The only published information that has come to the writer's attention concerning the methods that may be used in Europe for producing this souple finish on rayon is an article in the German publication "Kunstseide." Three methods for reducing the luster of rayon are mentioned.

The first method for giving the souple finish is by precipitating aluminum salts on the fiber with the aid of vegetable oils. A second process, which it is said will give a similar effect without impairing the handle of the material, consists of passing the rayon several times through a lukewarm 2 to 3% solution of sulphuric acid, followed immediately by immersion in a 3 to 5% solution of barium chloride at 70 deg. C. for 20 to 30 mins. The author states that this treatment increases the weight of the goods from 3 to 5%, and that the rayon may be dyed subsequently to this process if the dye bath does not contain glauber salt.

The third method recommended is the regular tin-phosphate-silicate weighting process used for real silk. It is said that rayon treated by this method is weighted to a somewhat greater extent than is natural silk, and at the same time the rayon assumes the appearance of weighted natural silk. No difficulties in dyeing or other finishing processes are introduced by this method.

In attempting to produce this souple effect on artificial silk, it should be remembered that some varieties of rayon resemble natural silk more closely than others, and it is probable, therefore, that the best results will be obtained if the rayon selected for treatment is of this type.

A finisher of knitted goods sends the following: The cloth or skeins are first treated in a bath containing olive oil soap, cocoanut oil, monopole soap, etc., squeezed and treated in a second bath containing an organic acid, such as acetic, formic, tartaric or lactic acid. These treatments may be reversed, applying the acid bath first, a proceeding the writer prefers for the reason that considerable acid and soap can be saved and the results better controlled.

In the experience of the writer, neutral olive oil soap and lactic acid give the most permanent and best all around results. The following recipe, which was worked out for 120—300 denier direct dyed viscose, does not claim to give the best results for all kinds of yarn, but will serve as an example:

The cloth or skeins are given four turns in a cold

bath containing 6.5 pts. of lactic acid (water clear and free of sulphuric acid) per 25 gals. of water. Squeeze, but do not drain, as the finish might come out uneven, and treat them immediately in a cold bath containing 5.2 lbs. gelatine and 13 ozs. of neutral olive oil soap per 25 gals. of water. Again give four turns, whiz (not too dry) or squeeze well, and dry at 160 to 180 deg. F. The addition of the gelatine is to render the silk more pliable and firm and to strengthen it for later processing.

If the feel is too soft (not scroopy enough) more lactic acid is needed. If too crisp and empty, the soap bath has to be made stronger. It is obvious that a different lactic acid or a different soap, or more or less squeezing or whizzing, will give different effects, and it must be left to the dyer to adjust the recipe to his particular conditions.

An engineer specializing on viscose products replies to this question as follows: In general, the luster of rayon is reduced somewhat from its maximum by treatment during the original manufacture of the fiber, rather than afterwards in a finishing operation. In manufacturing it is done by reducing the amount of tension during the first drying of the silk, or by the admixture of some such product as sodium silicate to the viscose solutions or setting baths. This, however, will do the inquirer no good as mills have to souple already finished rayon.

The inquirer is evidently aware that the lusters are somewhat reduced by treatments with dilute acids and has probably tried out the most of them and is familiar with the effects. The treatments with acids (the most common treatment being that with hydrochloric acid) are far from satisfactory, in general, but I am advised by a friend that his Swiss house has made very satisfactory finishes by reducing the lusters with monochloroacetic acid. Strengths are used up to 10%, time varying up to 2 hrs., following by thorough washing and a light soaping.

It is possible that the finish referred to is caused by a filler. An analysis of the silk should show this, however, for the treatments with tannin, with aluminum chloride, or the light loadings with tin or lead salts and with sodium silicate, are readily detected. It would be of interest to examine the silk microscopically also in an effort to determine if the luster has been reduced by treatment with any sort of polishing powder. A method of reducing the luster

by treatment with a pliable, impalpable powder was recently described as a new finish, and this also could be determined microscopically. Up to the present there has been so little information on and interest in these finishes that I have never tried any of them out.

Finally, we may say that a delustering process recommended by a large rayon manufacturer, which is comparatively easy to handle commercially and has been found satisfactory in obtaining a soft, dull finish on American viscose, is as follows:

(1) The rayon may be delustered by precipitating barium sulphate into the pores of the fiber. This may be done after dyeing, which consequently does not put any limit on the choice of the dyestuffs used. The process is simple and is carried out as follows: After dyeing, hydro-extract the yarn, then work in a cold solution of glauher salt, 1 lb. of glauher salt in 12 gals. of water, hydro-extract, then immerse in a cold solution of barium chloride, 1 lb. in 12 American gallons of water.

Or (2) pass yarn through bath of 2% alum and 1% soap flake at 60 deg. C.

Finishing Cotton and Rayon Bedspread

I am enclosing cutting of cotton and rayon bedspread right from the loom and would appreciate your obtaining any information you can as to what would be the most practical and best way to finish this class of work. I understand the trade wants a nice soft clothly feel to this fabric.
(5680)

Up to the present time the finishing of cotton and rayon mixed bedspreads has been done in the simplest possible manner; in fact, some plants are turning out rayon and cotton mixed bedspread fabrics without making any attempt to really finish them other than by passing through a pair of heated chilled iron rolls.

Certain concerns have gone to the method of running them through a 3-roll calender. This calender is of special construction for silk or artificial silk and cotton goods, having a middle chilled iron roll, 12 in. diameter, preferably heated by steam, or otherwise with low temperature gas heating apparatus. Top and bottom rolls are made from domestic felt or wool paper of fairly soft density.

Mounted at the entering end of the calender there would be some type of attachment for properly conditioning the goods before calendering. After passing through the calender and being finished only on the face, the goods are ready for putting up for the market.

Removing Paint from Woolen Clips

We are desirous of learning a method to remove paint from woolen clips, sample of which we are enclosing. Will you kindly advise us if there is any possible way which you know of to remove the paint, and leave the wool in perfectly good condition? (5707)

There is no way of removing paint from woolen clips without leaving the material in such condition that its working qualities are seriously damaged. Many experiments have been tried with all sorts of solvents, together with mechanical means, but none produced wool satisfactorily clean from paint and tar.

[Since the above was written a process for removing paint from wool has been developed and is used by Eavenson & Levering Co., Camden, N. J. The details have not been made public and the process can only be used by special arrangement with the owners, we understand.—Editor.]

Yarns for Curtain Material

It would be a great help to me if you could give me some idea of the class of yarns that go into the manufacture of lace curtain material on a Draper loom, equipped with a leno motion. I realize that this question is rather broadly stated. What I really want to know is whether a mill that is equipped to make 30s and 40s yarn can make suitable yarns for curtain material. Then if you could give me some idea of the state of this market and what chance a mill that has the advantage of low labor costs would stand in securing some of the business, I would surely appreciate it. (5978)

We assume the question refers to woven curtain material, that is, marquissettes. There is a wide difference between lace curtain material and marquissette curtain material. The former would require a lace machine instead of a loom.

Warp yarns of 30s, 40s, and 50s are the kinds mostly used in the weaving of marquissettes; that is, the single

yarns. These should be made from fairly good cotton and should have more than ordinary twist. The strain on the warp yarn during the weaving is much greater than when weaving the ordinary plain cloths.

There is always a good demand for marquissette curtain material, but the cloths have to be produced cheaply because competition is very keen. Production is high and the margin of profit per yard is rather small. It would not be a very wise move on the part of anyone to engage in the weaving of marquissettes unless he could be assured of steady business, for this type of weaving requires special equipment and special talent on the part of the weaver and the loomfixer.

The harness equipment should be the flat steel doup. The Steel Heddle Manufacturing Co. have lately developed a steel doup capable of weaving the 2 cross 2 leno. Medium and low count marquissette cloths are a very attractive weaving proposition if there is assurance of steady business.

Weaving Crepe Romaine

Can you give me the reeding, pattern draft, and drawing-in draft of crepe romaine? Does this fabric weave better with a skip draw or straight draw? (5713)

Crepe romaine is, in effect, a crepe georgette woven in a basket weave of two ends and two picks. In a regular crepe georgette, the warp and filling material is made of crepe twist yarns, in two-thread, three-thread, and even four-thread groupings, and these remarks about crepe georgette also apply to crepe romaine. The silk ordinarily employed is Crack Double Extra White, or Yellow, Japan, of 13/15 denier size. In the case of two-thread silks, a twist of 75 turns per inch would be about right; in three-thread, about 70 turns; in four-thread, about 65 turns per inch.

According to the finished results desired, the sizes of the silk employed, and the amount of twist in same, the goods will be laid in the loom at varying widths from 50 in. down to 46 in., which is the most usual width for fabrics to finish 39 to 40 in. wide.

In crepe romaine, as in crepe georgette, the threads will be warped two ends of right-hand twist, two ends of left-hand twist, and so on alternately, each pair of threads being

passed through one split in the reed. Reeds running from 40 to 50 dents per inch are usually employed, which will give 80 to 100 threads per inch of warp as woven in the loom.

Similarly, in the filling of the two fabrics, the threads are woven alternately two picks of right-hand twist, and two picks of left-hand twist. The essential difference between the two is that instead of the threads, as in crepe georgette, weaving one up, one down, they weave two up, two down, and so on alternately, both warp and filling ways, so that the threads all weave in pairs instead of singly. This makes a small, neat basket effect, and of course the construction is somewhat looser than in the case of a crepe georgette.

Fig. 1 shows the pattern draft of the cloth, though it is so simple that the above description should make it almost unnecessary. So far as the drawing-in is concerned, the straight draw will customarily be used. These fabrics can be woven on two harnesses if desired, but four would be better so as not to crowd the warp threads too much.

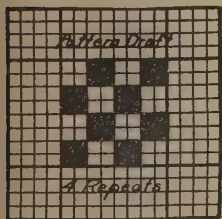


Fig. 1

In weaving this crepe twist for warp, very large crossing sticks are generally found desirable, say $1\frac{1}{4}$ in. in diameter, so as to

separate the threads sharply as they come forward and prevent their kinking and twisting around each other. Sometimes, where such large crossing sticks are not available, three of the ordinary size, say $\frac{1}{2}$ to $\frac{5}{8}$ in. in diameter will be tied together and used in this way.

The selvages may be either made of the same material as the warp, in which case they will shorten similarly, or they may be tape selvages, made of regular, two-thread organzine. In that event, they will fall into the peculiar puckers, or wrinkles, that such selvages exhibit when the goods are finished, an appearance which some people prefer.

The cloth in the gray will shorten somewhat from its woven length on removal from the loom, and may be expected to run up in that way 2% or 3%. If 100 picks to the inch were actually woven, after this creeping up or

shortening has taken place (which takes place prior to the measuring), the pickage would, in that event, have increased to 102 or 103 per inch. A further shortening of course will take place in the dyeing, this usually running between 4% and 6%. So that if a cloth has crept up 2% in the gray, and has been shortened in the dyeing 4%, the manufacturer would have to calculate on a 6% shortening. This matter of the creep-up in the gray is very often lost sight of by manufacturers, who, in making up their costs, are thus led into rather serious undercosting of goods.

JAMES CHITTICK.

Section Marks on Cotton Back Serge

I am sending you a sample of cotton back serge, and would call your attention to the streaks on the edges of each section. The sample was cut off a warp made with narrow sections in which I was trying to overcome those marks, but did not succeed. Our warping frames have been overhauled and are in perfect order. We put eight yards to the paper in our beaming. The streaks or section marks show up on that part of warp that was covered with the beaming paper and run for about $1\frac{3}{4}$ yds., gradually disappearing. We made a couple of warps with full sections, and used brand new beaming paper, with more weights, but still have these marks every time the paper comes off. Will you kindly oblige by giving me information in this case?

(5968)

Such goods have a tendency to show section marks unless extreme care is taken in the preparatory operations. The streaks shown in the sample are due to the ends on both sides of section being somewhat loose, due to their spreading during the warping process.

We would suggest that either a damp blotter or a cord be run on ends at small reed in order to eliminate spreading; and that the tension on warp will be sufficient so that when stopped it does not loosen the ends. Also do not allow your warpers to take back section to find a lost end, as this invariably causes a streak, due to the different tension.

In beaming, paper should be placed on the warp every 4 to 5 yds., instead of 8 yds., which also will help. The size of section does not make any difference, nor does using old or new beaming paper. The whole solution of your trouble is in the proper warping.

Stripping Color from Woolens

Kindly give me the best formula for stripping colors from old woolens of the various weaves. Advise how applied.
(5664)

The following method gives good results: Start with 3% of hydrosulphite and 6% acetic acid. Add the acid first, then throw the stripper right into the tub. Bring up to the boil and boil for twenty minutes. This will strip off a great deal of color. If you wish to take more off, throw in 2% stripper and boil for twenty more minutes. Wash off well and use a little ammonia in one of the washings.

When stripping with hydrosulphite, the best results are obtained by starting the bath slightly on the acid side. You can test out the stripping liquor with blue litmus paper; when the bath is slightly acid the blue paper will turn slightly red.

A great many men strip with chrome and vitriol, which is cheaper, and it chromes the goods at the same time. This is an advantage if you are going to use chrome colors for dyeing. By stripping with hydrosulphite, the goods are left in condition to be dyed any way required.

Scouring Wool Knit Fabric

Will you please advise our mill what emulsion is best fitted for removing all of the oil and grease from the enclosed piece of wool fabric? In your reply, kindly give temperature as well as percentages of material used, and the necessary rinses for the process.
(5665)

In scouring this piece of woolen knit fabric, the following method was used: The cloth was run in a rotary scouring machine in about 200 gals. of water. It was run for 10 min. in water at 110 deg. F. Then four pailfuls of soap were added and the cloth was run in this scouring bath for 20 min., keeping the temperature at 120 deg. F. during the entire time. Wash in water at 120 deg. F. for 20 min. Then scour in the same volume of water at 120 deg. F., adding 2 pailfuls of soap, for 10 min. Then wash in warm water at 120 deg. F. for 10 min. Then wash in cold water for 10 min. The soap is palm oil or equal parts of palm oil and tallow, made up as follows:

To 100 gals. of water add 100 lbs. of soap, 15 lbs. soda ash light, and 15 lbs. trisodium phosphate; boil slowly until all are dissolved.

Increasing Production of Card Room

In regard to increasing the production of the card room, some time back we ran short of roving in the spinning room, and in order to obtain a greater product from the card room the weights of the laps were increased and the additional weight was taken care of at the slubbers and first intermediates, thus feeding a heavier roving to these processes, and with a faster front roll speed, delivering the same weight roving as was delivered before the additional weight was applied to the laps. Since this change has been made, it is the opinion of some that the proper method of increasing the product would be to increase the speed of the carding. It is true that the cards are capable of faster carding as we have a surplus of cards and have them running at a slow speed. In view of the above conditions, please give me your opinion as to what method of increasing the card room product would be the most effective and best. (5973)

A superintendent replies to this question as follows: I would advise against speeding up the cards, but would think it better to make laps heavier and have some longer draft on cards, in order to let the stock stay as long as possible in the carding process. Then subsequently make the roving as heavy as possible, consistent with the number desired, trying to keep as near draft of 4 on slubbers, 5 on intermediates, and 6 on speeders, supposing that the number was under 30.

Another cotton mill superintendent gives the following opinion: In reply to the question of increasing the production of the card room by increasing the weight of the lap, or by increasing the production of the cards by a larger production gear, I should judge it would be much better to put a gear on the card to drive the doffer faster rather than to feed a heavier lap. The heavier the lap is the more the tendency to make variations in the sliver, whereas, with a lighter lap and faster carding, the cotton is spread out more evenly, though it is carded faster than with the heavier lap.

Some years ago I took charge of the mill which I now run, and found the card room running behind the spinning

room so that it was necessary to run extra time to give enough production to keep the spinning room going. I first started in on the cotton, to select and grade it properly with an idea to giving a uniform mix. Next I slowed down all the fly frames by putting a smaller pulley on the motor driving the frames. This enabled me to take out two teeth of twist in each fly frame process with the result that instead of running behind I actually saved about 10% of the former running time. I have since slowed down the fly frames further and find the work runs still better, and I am still able to keep the spinning room going nicely with some surplus. The inquirer might think this matter over. Since the inquirer states that he has a surplus of cards, I should judge it would be much better to run all of these cards on a light lap carded fast than to run a heavy lap carded slowly.

Analysis of Braid—Calculating Production

I am enclosing samples of green, pink and white braid. Am I correct in the counting that I have indicated? What gives the green sample the fine cross-ribbed appearance? Would it be dyed before or after braiding? How would one count the material in figuring cost? (5799)

The samples are too small for one to determine the stitches per inch. A sample should be long enough so that the stitches can be counted while the material is held at the same tension as while braiding. Braids are usually calculated according to the number of ends (or bobbins, when there is more than one end on a bobbin) and the stitches per inch. The number of bobbins determines the size of the braider. The stitches per inch are governed by the speed of the sand roll shaft on the braider.

Figuring costs. Given the stitches per inch and the size and known speed of the braider (or stitches per minute) the rate of production may be determined as follows: (Stitches per Revolution of Carrier) x (Revolutions of Carrier per Minute) ÷ (Stitches per Inch in Braid) = Inches Braid per Minute.

If several inches of the braid are weighed, it is a simple matter of proportion to figure yards per pound. Account should be taken of the possible number of machines that may be assigned to one operator. Of course the smaller

the braider the greater the number of machines one operator can handle efficiently. A better method is to figure number of carriers per operator, rather than number of machines. Count of yarn may be determined in the usual way; that is, by pulling out the ends and measuring, counting and weighing.

It is impossible to say whether the green sample was dyed before or after braiding. There is very little choice in either method. However, it is almost always necessary to run piece-dyed rayon goods through a finishing machine to remove the wrinkles due to handling in dyeing. The fine cross-ribbed appearance is produced by running the tape between two fine-milled rollers. It is a similar process to the old-time watered silk effect.

The green and the white samples were made by using one end on each braider bobbin; the pink sample was made by using two ends on each bobbin. The stitches in the three samples as they lie on the paper count as follows: Green 26; pink 22; white 16. These figures, however, are only useful for comparative purposes.

Maximum Temperature for Drying Elastic Webbing

Can you give us any idea as to the maximum heat allowable for drying, after sizing, woven materials containing rubber thread; that is, without injuring the rubber thread? The sizes of rubber thread involved are numbers 36 and 40.
(5934)

There are so many factors involved that it is difficult to state just what the maximum allowable heat would be. It seems to the writer that it is not so much a matter of temperature as it is a question of how long the material is subjected to heat. Elastic goods can actually be run through a gas or an alcohol flame without any noticeable injury to the rubber thread, as is the practice with much of the material that is used for men's arm garters, the purpose being to remove the fuzz, or loose fibers. Some of the factors to be considered are as follows: the thickness of the material, on which of course depends the amount of moisture that will be absorbed as the goods pass through the size bath; the texture, to which the same remarks are ap-

aplicable; the kind of size used and whether or not it is applied to one or both sides of the material; and the pressure of the rollers which determines the amount of moisture that is pressed out of the goods.

On the ordinary calendering machine, where the material is dried by running over a number (usually eight or ten) of steam heated drums, the steam pressure is about 15 lbs., which is equal to a temperature of about 250 deg. F. This is the temperature of the interior of the drums and, of course, allowance must be made for the loss in transmitting the heat to the outside of the drum. It might be safe to say that the contact temperature is in the neighborhood of 230 deg. F.

The material is run over these drums at a speed only fast enough to remove the moisture. The thicker the material the slower it must be run through the machine in order to dry it, but this same thickness usually affords the rubber thread a greater protection from the heat.

The above temperature will not injure the rubber if, in piecing, the machine is not stopped for more than a few minutes at a time. The material should be cut out, or run continuously during the noon hour, and should always be run out, or cut out, each night.

Decating Knit Jersey Cloth

I would like to get information on decating jersey cloth. What type of machine is used, and how is the cloth handled during the operations? I have never heard of doing this in this country but I believe it has been done abroad.

(5886)

One concern finishing jersey cloth handles about 150 to 200 pieces daily and half of this production is decated. Their method is as follows: Goods are fulled, scoured, dyed, dried, pressed, and then left on the tube for the decating process. After decating, the goods are re-pressed so as to insure an even width throughout, then the usual examining and making-up for the trade follows. The decating machine made by David Gessner Co., Worcester, Mass., is used. Samples of jersey before and after decating clearly show the results of the process.

Recently, jersey cloth has been put in its best condition for tailoring. Dresses have been made with pleats and other

fancy effects, hence the decating. The decated jersey tailors well, holds its shape better when the garment is made up, cuts better, shows the fabric at its best, and handles more like a woven piece of material.

Silk Looms in a Section

Have you at hand any figures showing the number of looms that a loom-fixer takes care of on various silk goods? I am wondering how many looms it is common to have in a section on such goods as broad silks, shirting materials, dress goods, etc.? (5893)

It is customary in some mills for a fixer to run from 35 to 40 box looms in a section. The number of looms per section must be governed by the ability of the loom-fixer, as some fixers can run a section of 50 better than others can run a section of 35. By having a helper to every two or three sections to lay in and start up warps, it is possible for the fixer to run his section more efficiently and also to care for more looms.

Streaks in Dyed Fleeced Jersey Cloth

We are having considerable trouble with dark or black streaks, as shown by the enclosed samples, on our brown and navy fleeced jersey cloths. This trouble occurs on our straight cotton cloth as well as our cotton and wool mixture. The straight cotton goods are boiled-off in the regular way and are dyed with a combination of direct and union colors. Our wool and cotton mixtures are scoured and dyed with the same combination of colors or dyestuffs. We use about 20% of common salt. We have also tried glauber salt on our wool mixtures. Our dyestuffs are dissolved carefully and strained, and goods are handled in our six-string open dye tubs in the usual manner. Even when we extract and dry on upright dryers promptly as the goods leave the dye kettle so they will not remain in boxes or on the dry pipes, we have the same trouble. We have tried to give you as complete information as possible as to our processing, but if you would like anything further please write us. We hope you can give us a suggestion which will be valuable and correct this. (5876)

After examining the two swatches, particularly the blue one, we would say that the trouble is in the way the cloth

is handled during the dyeing or after dyeing. By taking a white cloth and wetting it with the tip of your tongue, and then rubbing it on the dark streaks, you will notice the cloth is stained with dyestuff, showing that the dark streaks are dyestuff streaks.

Streaks of this sort can be caused by several things, such as having the dye bath too short, crowding the kettle, feeding on dyestuffs improperly for an addition, not washing off carefully and drying out before extracting.

In running the goods with the kettle three-quarters full of water, wet out the cloth thoroughly. Dissolve your dyestuffs and strain into the kettle; run without steam for 10 minutes, add half your common salt, bring the temperature up slowly, say one hour, to the boil, sample the cloth for shade, then add last half of the salt. Boil gently to dye the wool for 15 minutes or so, shut steam off and run for 15 or 20 minutes in the cooling bath so that the cotton will take on more dyestuff. If you have to make an addition do not feed it on too quickly or have it too concentrated; give it a chance to circulate through the cloth before putting on the steam again.

After dyeing, turn on the water and let the kettle run until the wash water looks pretty clear. This is a safe method of dyeing your goods. You should not have much trouble if you watch the operations carefully.

Silk Fabric Constructions

Can you advise me what per cent raw silk fabrics shrink in dyeing and finishing? Also, do weighted fabrics shrink more than pure dyes? For instance, we are weaving a flat crepe which is reeded $42\frac{1}{4}$ in. in the reed, 72 picks. What width will this finish in the dyeing, and if weighted will there be any difference from pieces finished pure dye? Will a 4-thread, 14/16 Canton, 55/60 crepe twist, instead of 4-thread Japan crepe 60/65, finish narrower in the above construction? If we should decide to change our picks to 76 per inch instead of 72, will this give us a wider width in the finished fabric, and if so, can you tell us how much? I shall appreciate any information you can give me to determine the percentage of shrinkage of various silk fabrics. (5894)

A flat crepe reeded $42\frac{1}{2}$ in. in the reed, 72 picks, will be about $39\frac{1}{2}$ in. wide after finishing. Changing from 72 to 76

picks will not make any difference in the finished width of the goods, as the number of picks put in a piece does not govern the width, this being governed by the number of ends and width of the warp.

Weighted goods shrink very little more in the width than pure dye, but shrink considerably more in the length, there being from 6 to 10% shrinkage in the length of weighted goods in comparison with pure dyes.

Using a 4-thread, 14/16 Canton, 55/60 crepe instead of a 4-thread Japan crepe 60/65 will make no difference in the width of the cloth. We would suggest that if you desire to have your goods 40 in. wide after they are finished that they be woven at least $43\frac{1}{2}$ in. in the reed. Your dyer should be able to give you exact information regarding the relative shrinkage of your different constructions.

Water for Dyeing—Corrosion of Pipes

(1) I am interested to know if hard water is deleterious to sulphur black dyeing. Is water more troublesome in the dyehouse at this time of the year than ordinarily?

(2) Which causes corrosion of iron pipe the quicker: ordinary soft water lying in the pipes or condensed steam (distilled water)? I refer to a dye tub which seems to be giving us trouble in the form of very fine iron rust.

(3) What sort of pipe line is advisable for water in a dyehouse? (5805)

(1) It is a general rule that soft water should be used in dyeing. In the case of sulphur black dyeing one of the chief objections to hard water is that it is liable to produce bronziness. At certain times of the year it is found in some localities that water is more troublesome than at other seasons. In the spring it often happens that the supply is polluted with ground water which brings impurities with it. At other times the decaying of vegetable matter in the water supply gives rise to trouble.

(2) Corrosion of iron pipes by water is dependent upon several factors. Other things being equal, condensed steam usually causes corrosion more quickly than ordinary soft water.

(3) In the dyehouse, pipe lines for cold water are usually of galvanized iron. Despite the high initial cost, brass pipes are recommended for hot water. A comparatively new

method of preventing corrosion of iron pipes by water is by the systematic addition of sodium silicate to the water supply. The silicate is applied either in liquid or solid form and is said to form a self-healing, protective film on the metal surfaces, thus eliminating red water and decreasing corrosion. Apparatus for the application of silicate in solid form for hot water systems has been developed by F. N. Speller of the National Tube Co., Liquid silicate is used for treating cold water.

Holes in Full-Fashioned Legs

We are sending two full-fashioned legs and wish to call your attention to the holes close to the instep. We are finding these holes from time to time but are unable to determine what the cause is. Your advice as to this matter will be greatly appreciated. (5875)

This is one of the big troubles in making such goods. There are so many things that will cause it that we must experiment in order to locate the source. It may help to mention some causes. The needles may be set too low, causing them to pull too much "loop" or, as it is termed, "too much knock-over," which will cause cut holes. If a dampening solution is used in the knitting and same is not oily this will rust the needles along the bottom of stem and when fabric hangs loose, which it will between the heels, the loops will tear as in your sample. If the catchbar is too forward this will cause cuts. If needles of an uneven length are used, in order to make the fabric clear, one will put on so much "knock-over" that the short needles will cut holes.

Then again, if you will examine the fabric closely you will see there is a tight and loose course running across just when the cutting occurs. This can be caused by the carrier tube through which the silk passes to the needles, first right and then left, becoming worn more on one side than on the other and so dragging one side and not the other. Or it could be caused by the silk being wound wet; as it becomes dry on the outside of the bobbin the end will "stick." Yarn is sometimes wound too tight around the stem of the bobbin, which will produce the same result occasionally as the end comes to the stem or outside of the bobbin.

There is another probable cause for this trouble. Sometimes a fixer will place his pliers, screwdriver, etc., right on the fabric while he examines some part, unconsciously trapping the work and cutting holes like those shown. Again, sometimes the bar screws which hold the points in bars are too long and go clear through the bar. When the bars are placed on top of each other (with the instep naturally between them) a hole will result. If the bars with the tops in them are placed carelessly on the footing machine they may slip and trap the instep; this is often the cause. The leg with only one cut looks as though the scissors (used by the legger when cutting the end to the left of hole) were stuck into the instep at that time. To avoid this see that the scissors have rounded points.

Last, but most important, look out for mischievous help. The writer had a case recently, and has had several in times past, where a boy from pure devilment would cause trouble like this.

Bleaching Goods Containing Tinsel

We would be glad to receive any information you could give us in reference to bleaching silk, or silk and cotton goods containing tinsel yarns; that is, the cotton thread covered with metal tinsel. We desire to obtain a method to get a clear white on such goods, without tarnishing or discoloring the tinsel. (5795)

The writer has never seen a bleach that would not tarnish or discolor the tinsel. In making such fine goods as specified, it is usually the custom to use bleached yarns so that no excessive bleaching treatment is necessary after the goods are made up.

We would suggest that the inquirer write to manufacturers of sodium peroxide and peroxide of hydrogen with the idea of finding whether they can recommend a bleach which will not tarnish or discolor tinsel yarns. The writer is of the opinion that a manufacturer of such materials, which are really extreme novelties, should take into consideration the fact that it is practically impossible to treat metal or tinsel yarns in any wet process without considerable risk of discoloring or even destroying the material.

Finishing Dotted Swiss Fabric

I am sending a small sample of dotted swiss and would appreciate your giving me any information you can as to how this class of fabric is handled in the finishing department; also the machinery required. (5787)

This fabric is an embroidered product. The plain piece goods, before embroidering, are finished in a bleaching and finishing plant and dyed the lavender shade, after which they are embroidered on an automatic stitching machine. After embroidering, the goods are passed over a special revolving blade thread-cutting machine to remove the loose threads on the back of the dot.

The writer has handled thousands of yards of this class of goods from the embroidering mills which never were finished other than to cut off the threads. This was due to the fact that the plain fabric was already finished to the proper degree before stitching with the white swiss dot. It will, therefore, be understood that there is really no finishing necessary on these goods after they are embroidered. All that is done after the shearing or thread-cutting is to put them up in special packages as demanded by the market.

This particular effect of white dot on a dyed ground cannot be imitated or duplicated in a woven effect except in solid colors; that is, the goods could be made in the gray with a woven dot and afterwards dyed in all blue, lavender or any solid color, or otherwise finished in white.

Silk Fuzzy in Weaving

During the recent period of hot weather, considerable trouble with raw silk fuzzing up in the looms in a silk mill was experienced. We tried various remedies, but did not achieve any great success. May we have the benefit of your cooperation on this matter in suggesting perhaps some solution that could be applied to the raw silk to lay the fibers? (5879)

A silk manufacturer replies to this question as follows: I experienced the same trouble and was unable to find any remedy for this fuzzy condition. The way we overcame it was by not soaking the silk and running it bright, which was a considerable help. The Neutrasol Products Corp. make a preparation called S. S. compound which, when sprayed on the silk, has a tendency to lay the fibers. I would suggest to the inquirer that he try some.

What Is Turnover?

I would ask that you give me, either personally or through the question and answer page, an answer to these questions: What is turnover? How is turnover figured? What is the best form to use? (5878)

The turnover of a business is the net sales divided by the total amount of capital invested. If a business has a turnover of three times, the net sales must be three times the total invested capital. This statement clearly indicates how turnover is figured. No form is necessary in figuring turnover but your request for a form makes us wonder whether you have in mind something other than turnover.

Piece Work in Worsted Drawing

Will you kindly give us any information you can regarding the setting of piece rates on Bradford dandies? The writer is interested in a Bradford mill, which has 36 spindle rovers. Some of them are 6 by 3½ flyer, others 7 by 4 flyer and 7 by 4 ring, and still others 8 by 4 ring. The dram roving is anywhere from 4½ to 9. The speed of the flyer rovers is 1600, and on the ring rovers 2250. Can you tell us the per cent efficiency which a girl should get off, and on which we could base our piece rate for various counts of yarn? (5789)

In worsted drawing, Bradford or French systems, piece work is not very popular with the management. Day wage has been found to give more satisfactory results in the quality of the roving produced. Some mills have proved by experience that piece work does not pay even when used only on the last operation. Production is increased about 5% when a piece work system is in use.

The actual efficiency must be determined in every mill, for conditions vary. Efficiencies range from 65% to 80%. For an average, we would suggest 70% to 75% efficiencies, for ordinary open drawing, and slightly less for ring rovers, as it takes longer to doff and start up the frame and the time stopped for doffing means a greater loss in efficiency. Ring rovers require a little more twist than dandy rovers for the same dram roving. Production on ring rovers therefore does not increase in direct ratio to increase in speed; that is, 2,250 r.p.m. of ring spindles and 1,600 r.p.m. of

flyer spindles will not yield 40% more production from the ring rovers than is obtained from dandy rovers.

The wages paid vary from \$15.50 to \$19 per week of 48 hrs. It all depends upon the number of spindles, the production and attractiveness of the work being run, combined with what the operatives are willing to work for. Running 4½ dram to 9 dram roving a girl should handle three 36-spindle dandy rovers, or two 36-spindle ring rovers, giving about 70% efficiency. Some mills pay a flat rate throughout the drawing, others have three rates, paying least on the gill boxes and most on the heavy drawing and weight box, the fine end of drawing receiving a rate in between.

Imitation Chambray

We understand the enclosed is an American-made cloth. We should be very much obliged if you could say how the effect on the cloth is got. We cannot make out whether the cloth is printed or backfilled. (5796)

The sample is what is known to the trade as an imitation chambray. These goods are taken in the condition as they come from the weaving mills, laid out on flat trucks, and sewed with the piece ends together for continuous operation. They are simply passed over a heavy 3-roll padder with all rubber rolls about 14 in. diameter and immersed in liquor composed of direct color and starch solution. To give the proper finish they are dried from the padder over a combination of drying cylinder and tenter, then wound up on rolls ready for calendering.

Calendering usually consists of passing over a 5-roll machine with two metal rolls and three combination rolls—cotton and corn husk. The goods in a gray condition, being not really fully absorbent, do not take the dyestuff readily and thereby the chambray woven effect is obtained, making fabrics appear as though they were constructed from printed yarns or yarns made from gray and dyed yarns twisted together.

A great deal of this class of merchandise has been produced in the last few years by concerns in the vicinity of New York specializing on it. For the information of the inquirer, the writer would state that high productive methods are used in turning out this class of work at a low price.

Bleaching and Dyeing Pongee

We are experiencing some trouble in bleaching and dyeing pongee and other silks. We are bleaching our silk with peroxide and dyeing with acid colors. Sometimes we obtain satisfactory results and at other times the goods are not uniform, some pieces being penetrated by the dyestuff while others are not. What we would like to know is whether there is a more satisfactory method for bleaching pongee, and whether this silk could be better dyed on the jiggers. (5797)

With the limited information furnished in this inquiry, it will be expedient to consider carefully each step as the cloth moves from the loom through the finishing department, and to suggest or emphasize each possible cause for uneven dyeing. Faulty weaving and yarn that is not uniform in size will cause shaded areas in the cloth. This, however, is easily detected as the shadiness will be found to be regular and across the whole width of the piece. Sometimes silk yarn bought from different firms, or different lots of yarn, will dye shaded if woven into the same piece of goods.

The first procedure in the finishing department is of course a proper degumming. In case the degumming is not thorough, the penetration of the dyestuff will vary, causing uneven dyeing. Many mills use a standing bath (three or four operations) in degumming. Until your present trouble is eliminated, I would suggest using a new bath each time, and should the water used be the least hard, you will find that a special degumming oil will give better results than soap for this operation. It is also very important to give at least two warm water rinses (130 to 140 deg. F.) and a cold water rinse after degumming.

Before bleaching, the cloth should be hydro-extracted or thoroughly squeezed. The practical method of bleaching silk piece-goods before dyeing is by the peroxide method (either the hydrogen or sodium peroxide). Should hydrogen peroxide be used, first neutralize the acidity of the bath (hydrogen peroxide is sold on the acid side) with sodium phosphate, then add the required silicate of soda. Should the silicate of soda be added to an acid bath, silicic acid is formed, which adhering to the cloth forms resist spots that will not absorb the dye.

Should sodium peroxide be used, it is also essential that the bath be neutral before the silicate of soda is added, for if on the alkali side, the silk may be damaged, and if acid, silicic acid will be formed, with the possibility of resist spots. Where the goods are to be dyed it is not very good policy to bleach in a vat, as in still bleaching it is very difficult to control the temperature so that it will be uniform throughout the mass of material. Where the temperature is not uniform, uneven bleaching with subsequent uneven dyeing results. A bleaching machine, where the material is in motion, is to be desired.

After sufficiently bleached, give at least two warm rinses (130 to 145 deg. F.) and one cold rinse. With this class of goods, it is usually customary to load before dyeing. Assuming that you are loading your material, I wish to emphasize that here is probably your source of trouble. Before loading, extract or squeeze thoroughly and uniformly, and make sure that the squeeze rolls are squeezing uniformly from end to end; that there are no worn or hollow spaces in the rolls, and that the machine is not stopped with the goods in the loading solution. After loading, rinse thoroughly at least thirty minutes with a warm running wash. Finish with a cold rinse.

In dyeing, add the dyestuff (previously dissolved in boiling water) and acetic acid to the dye machine, and run cold 15 min.; then bring up to temperature gradually. The addition of a penetrating oil will assist in obtaining uniform penetration. However, care must be exercised in picking the proper oil, as all oils cannot be used in an acid bath.

Jig dyeing this class of material is conducive to better results, as well as leaving the silk in better condition. But jig dyeing will not eliminate the difficulties incidental to uneven loading.

Capacity of Tank for Bleaching

Thank you for your reply to our question (No. 5752) regarding volume of tank required to bleach 2,000 lbs. of skein yarn. You replied that we would need a bleaching tank of 220 to 230 cu. ft. capacity, and gave as a comparison a pressure kier 6 ft. diameter by 6 ft. high, which is large enough to boil out 1850 lbs. of yarn. It has always been our understanding that a larger tank is necessary for bleaching than for boiling an equal amount; as in bleaching

the yarn is piled comparatively loosely and is not under pressure, while in boiling the yarn is packed fairly tight and under pressure. (5765)

The capacity in cubic feet of a 6 ft. diameter by 6 ft. high kier is approximately 170 cu. ft. A cement tank of 220 to 230 cu. ft. should have sufficient capacity for 2,000 lbs. of skein yarn. As a matter of fact, if the skein yarn is kier-boiled, it is naturally absorbent and will lie closer than if it were in the gray condition. If the inquirer wishes to build the cement tank 1 ft. higher, to give more cubical contents, it would give ample room for 2,000 lbs. of skein yarn.

Loss of Moisture in Worsted Yarn Manufacturing

Will you please give me information regarding the following: In running tops through the drawing, I find that we always have an invisible loss of 3 to 4%. Every lot we run through I have moisture tests made of both tops and rovings, and these results correspond with figures of roving production. For instance, if we put 1,000 lbs. of tops, through drawing, say showing a moisture test of 12%, the rovings produced after making allowance for waste will average 3 to 4% less than the tops. They will also show this per cent loss in moisture. Both day and night the humidity is kept at 70%, with a dry bulb temperature of 70 deg. Referring to Hartshorne's tables in "Fundamental Laws of Humidity," I find that this percentage of humidity gives a regain of 17.4%. This being so, the stock should at least retain its moisture content. In practice, however, the reverse proves to be the case, and never have we run a lot through without at least 3% loss. To get good yarn results we must of necessity add moisture in spooling, or elsewhere, to bring the percentage up to 13%.

With rovings giving a moisture test of from 8 to 9%, it means spinning yarn 4 or 5% light, which is impossible with some stock. If the yarn is not spun correspondingly light to allow for added moisture, then it will be off in counts. I will appreciate very much any suggestion you can make. (5783)

This condition exists in every mill and is the result of the manipulation of the material. Mr. Hartshorne's figures are correct, but you do not quote them correctly. A dry bulb temperature of 70 deg. F. with 70% relative humidity will give a wool regain of 17.4%. Under these conditions, the wet bulb temperature should be 63.5 deg. F. Hartshorne

and Schloesing both have proved in independent experiments and tests that vegetable and animal fibrous materials, when exposed to air of given humidity, for a sufficient length of time, will either absorb or yield up moisture until a state of equilibrium is established between the moisture in the material and that in the surrounding air. There is a difference in relative conditions surrounding a loose skein of yarn or a quantity of open clean wool kept in one position, and that of top continually being processed until the final stage of yarn is reached. If material loses moisture then conditions favoring evaporation must surround it as it passes through each machine. The rate of evaporation will increase if there is (1) a decrease in relative humidity; (2) an increase in temperature; (3) accelerated movement of air over the material; and (4) a more open condition of the fibers.

It is the writer's opinion that the temperature is higher and relative humidity is lower in the drafting and condensing zones than in the rest of the room. Friction absorbs power, generates heat and so affects the temperature. Try and visualize conditions existing at the porcupine; fibers under tension being rapidly drafted, creating suitable conditions for evaporation. Then the action of the rub aprons, confining the end in a chamber where much friction exists. Moisture must be liberated. Consequently, each process finds the material less moist. Being wound into a large compact package, there is a slow rate of absorption between processes. It is considered good practice to have the material give up moisture very slowly to the atmosphere during the manufacture of French yarns. Whether roving contains 5% or 13% moisture, the resultant yarns, if based upon a standard condition, must contain a definite weight of wool. Spinning the counts "light" allows for lack of moisture. Even when conditioned roving is used, the result is the same, the yarn containing 8% to 10% moisture.

Seventy degrees F. is too low a temperature, especially for spinning. Try 75 to 80 deg. F., with 70% relative humidity for medium wools, and 75% relative humidity for fine wools. These conditions should improve the roving, reduce rubber and brush waste, and give a better spin. If yarn is mule spun, high relative humidity is helpful for the fine wools. For ring frames, due to principles of winding, high humidity affects the spin. There is less cohesion

among the fibers and the density of the air offers more resistance to the yarn. The correct conditions can easily be determined by observation.

You state that "day and night the temperature and relative humidity are constant." Satisfy yourself that Mr. Harts-horne's statements and tables are correct by suspending a skein of yarn and a skein of top in the room. Obtain the original weights—we suggest 8 oz. samples—and then note carefully the weights on successive days. The results will prove very interesting.

Gauge of Full-Fashioned Hosiery

Would appreciate any information you will be able to furnish in regard to determining the gauge of a full-fashioned hosiery. (5790)

The gauge of a full-fashioned hosiery machine is the number of leads holding two needles each in a distance of three inches, which is equivalent to the number of needles in one and one-half inches. If you are interested in determining the gauge from the finished stocking itself, you have a matter which requires judgment.

Some retailers think that the gauge of the stocking is indicated by the number of courses per inch. But you will find upon examination that the courses per inch, even in a full-fashioned stocking, vary to some extent—probably more than the manufacturer would like to admit—due to the fact that the stocking is not knitted to the exact shape of the boards and so when it is boarded it must be expanded or contracted a little in width, which of course varies the texture somewhat.

The courses per inch may serve as a guide but cannot be taken as a definite measure. It has been customary to use a needle space of 14 in. when starting the top of a full-fashioned stocking. Knowing this, and actually counting the total number of needles used at the top of the stocking, it is possible to determine the number of needles per inch.

For example, a sample stocking has 362 wales which can be counted, and possibly 2 or 3 more in the seam which are not visible. Dividing 362 by 14 gives just under 26, as the number of needles per inch in the machine. The gauge of this machine would then very likely be 26 needles per inch multiplied by $1\frac{1}{2}$ in., or 39 gauge. Some manufactur-

ers do not use the full 14 in. of needle space, which serves to complicate things further. You can readily see that if in the above case the manufacturer used only 13 in. of needle space, the division would be 362 divided by 13 which is just under 28 needles per inch, which is 42 gauge. These are the two more common gauges, and it is easy to understand how judgment is necessary in attempting to settle the question.

Knitting Fancy Patterns

Will you tell me how to figure out the patterns on Leighton machines with pattern wheels? The machines are 9 cut to the inch and different size heads. (5809)

On this type of machine, the pattern wheels take the place of raising cams for the cylinder needles. When a notch is cut in the wheel, a cylinder needle stays down and so does not catch the yarn at the feed at which this wheel works. In this way, using several feeds and knitting with some needles at one feed and other needles at other feeds, patterns can be made, especially if different colors are used at different feeds.

The general design principle involved is like that used on the spring needle disc presser designing. To make a vertical stripe, one needle must knit with one color and then must stay down on all feeds using other colors by always coming where those wheels are notched. To make more complicated patterns, the wheels are divided up into sections equal to the width of the pattern and then the various courses are arranged in the proper places on the various pattern wheels. The total number of needles in the cylinder and the size of the pattern wheels must be in certain definite relations to produce certain effects, and there is always a limit to the size of pattern possible; that is, to the number of wales wide and the number of courses long.

If the inquirer will send us a sample of cloth, or a design he wishes to use, and the following details of the machine he wishes to use, we may help him more definitely: total needles in cylinder, diameter of cylinder, yarn sizes and colors, and size of wheels desired or on hand.

Hooks Break Off Needles

We are having considerable trouble with the hooks breaking off our needles, and would like to know if this can be stopped. We have tried everything as far as our knowledge of machine adjustment goes. Our latch guard rings are polished carefully and set properly. This trouble does not confine itself to any one machine nor to any few machines, but we may get two or three from each machine during the course of our knitting day. We are enclosing a stocking, also some needles with the tops off, which may help to make our point clear. (5869)

We find your needles have an excellent temper in the body but the hook part seems a little on the brittle side. We suggest you send a few back to the maker and have them drawn a little more at the hook only. He doubtless has a machine which will do the work very accurately.

We think it would be well for you to examine your needle bands to be sure the needles are being held back in the slots where they should run. Also be sure that the picks do not return against the needle butts with too much force, and that the needles do not bind in passing under the stitch cam points. If the machines are working properly you should rarely lose a hook unless you get a bent latch first and cause the needle to load.

Warp Mercerizing

Would you kindly answer a few questions regarding warp mercerizing? If you are unable to answer these questions could you send me information as to where I might be able to have them answered?

(1) What is the standard speed of warp mercerizing machine?

(2) How long is it necessary for yarn to remain in strong caustic to become saturated with liquor?

(3) Is it necessary to remove all traces of caustic from yarn that is for bleaching or vat dyeing after mercerizing?

At the present time I am using acetic acid as a neutralizer, which I think could be done away with on yarn that is to be bleached or vat dyed. (5806)

In the mercerizing of cotton the time of immersion ranges anywhere from one-half minute to three minutes, depending upon local conditions. The latest researches show that the

mercerizing effect of strong caustic is practically complete in thirty seconds. In the interest of economy, therefore, it is advisable to allow one-half minute for the yarn to remain in contact with the mercerizing liquor.

The speed of a warp mercerizing machine is dependent upon the size and type of the machine. Modern continuous warp machines are frequently 150 ft. in length, have from fifteen to eighteen compartments, each equipped with guide and squeeze rollers, and have a capacity of some 100,000 lbs. of yarn per week. The first two or three compartments of the machine are generally used for boiling out the yarn, and are filled with soap, soda ash, dilute caustic, or other detergents. The next two compartments are for rinsing with hot and then cold water. Following this cold rinse are the compartments containing the mercerizing liquor; usually three boxes are used for holding the strong caustic and in some types of equipment the upper guide rollers of these compartments are raised several feet above the body of the machine so that the yarn can get the necessary time of immersion in the caustic without reducing the speed of the machine or increasing the number of compartments. As stated before, it is important that the yarn remain in contact with the strong caustic for at least thirty seconds. The next three or four compartments are for counter washing with warm water, and the remaining boxes for souring with weak acid and for the final rinsing. Often dry cans are connected to the machine, in which case the warps pass directly over the drying cylinders.

It is the usual practice to remove all the caustic from yarn that is to be bleached or vat dyed. It is doubtful, however, if it is necessary to neutralize with acid providing the yarn is not dried between the mercerizing and the subsequent operations. In the case of yarn that is to be dyed dark shades with vat colors without bleaching, the small amount of caustic which would remain in the warps after a thorough washing with warm water should be beneficial rather than detrimental. In bleaching with chemic, the alkali would probably slow up the bleaching to a slight extent, unless the bleach liquor was made slightly less alkaline. A weak sour before bleaching is often advantageous, but there is no reason why dilute sulphuric acid could not be substituted for the more expensive acetic acid which you are now using.

The trouble complained of is a common one. It is usually caused by a too harsh treatment both chemically and mechanically. In degumming this material a neutral soap and a small amount of silicate of soda (not over 1%) should be used. Soaps or degumming oils containing too much alkali have a tendency to make the silk fiber harsh or brittle, then the least friction or pulling will give the results complained of.

It is a very good idea to line the mesh bags with cheese cloth (on inside). This will prevent the corded or knotted threads from injuring the hose where they work to and fro. Also in pulling the hose from the bags after degumming or after dyeing, the dyer should be instructed to handle them with care, for if they are pulled when tangled the marks shown in the sample submitted will result.

A brief outline of how silk hosiery should be handled is as follows: Degummed—10% neutral olive oil soap (not loaded with silicate of soda); 1% silicate of soda. Boil 1 hr. Rinse with two warm waters (145 deg. F.) and one cold water. Unload, hydro-extract and remove hose from bags; disentangle with care. Load in bags again and dye as required.

Wool Skeins Stained in Storage

We are sending you a sample skein of unscoured yarn which had been stored for about two or three months. On this skein you will note a yellow discoloration. This stain appears on the yarn where it had not been exposed to the air; that is, it seems to be on that part of the skein which was in the center. Possibly you can tell us what this is caused by, so that we can prevent future occurrences. We are unable to scour this out, and possibly you may have something to suggest to remove this discoloration. Any help which you may give us will be greatly appreciated.

(5924)

The skein submitted was carefully examined and showed no trace of injurious chemicals in either the stained or unstained portions. Not knowing what sort of oils were used as lubricants in the yarn manufacturing, it is rather difficult to state specifically just what the trouble is. However, on treating the stained portion with ether the stain was completely removed, showing that there was a deposit of fatty matter.

The fact that the stains showed up in the portions of the skein not exposed to the air is not surprising, since this would happen through the process of osmosis or capillarity. In this way the oil would be concentrated in the unexposed portions.

There is the possibility that the fatty matter in your wool oil when used was not in a complete emulsion. This condition would also give the stain as explained above.

Repeat Marks on Twill

Enclosed is sample of two and one twill which shows plainly tracks across the back. This filling is 4-thread Canton, woven two right and two left. We will be pleased to have your opinion as to possible cause of this trouble.

(5916)

The cause of this trouble is that harnesses are not timed right. The marks are repeat marks. We would therefore suggest that the loom be set so that when lay is on the front center, the harnesses are ready to change.

Numbering Rubber Thread

I am familiar with the standards of 840 yds. and 560 yds. as used in the numbering of cotton and worsted yarns, but I would like to know how rubber thread is numbered. I refer to the rubber thread used by the manufacturers of elastic fabrics. Can you advise me what system is used in numbering this rubber thread, and also which numbers or sizes of the rubber thread are most largely used? (5822)

The number or the size of rubber thread is established by the relationship of the thread to a cube of 1 in. For example, size 24s would be $1/24$ of an inch in the measurement of any of the four sides which form the square thread of rubber. The manufacture of the various sizes required is accomplished by very accurate mechanical adjustment of the heavy calender rolls through which the soft, pliable rubber is passed when it is being formed into sheets before vulcanization takes place. After being vulcanized and carefully tested to prove the size, this sheet of rubber is wound on a drum or roller and placed in the cutting machine. Here a circular knife, having a razor-like edge, revolving at a very high speed, cuts the sheet of rubber clear down

to the drum on which it is wound. The knife travels across the drum, the speed of its travel being mechanically adjusted so that the rubber thread is cut perfectly square.

Where a flat rubber thread is required, such as is used for certain kinds of elastic webs, the size of both the thickness and width is designated. Thus, 32x16 indicates that the thread is 1/32 of an inch in thickness, and 1/16 of an inch in width. To measure the various sizes of threads, a gauge is used very similar to that used for measuring wire. For testing sizes, the thread is carefully dropped in the gauge at the opening where the sides of the square thread will hug the gauge easily, without any stretching of the thread. Sizes used range from about 18s to 48s, but the sizes most generally used are from 28s to 38s. Odd numbers are not used in sizing rubber thread.

Holes in Finished Rayon and Worsted Mixture

Can you tell me the best way to finish cloth like the enclosed sample. I have finished and bleached this cloth but I find a lot of breaks and holes when it is on the perch. I scour in the washer in the usual way and then bleach. One thought that comes to me is that perhaps the washer rollers are too rough on the cloth, and I am going to try scouring in an open kettle. In the meantime anything you can give me on this matter will be greatly appreciated. (5930)

If this fabric is free from holes and drop stitches before scouring, it is proof that the rayon is breaking away from the worsted. We would suggest that the scouring be done with a very high bath, both in the soap and in the wash off, not allowing the goods to drag at any time. Also run them without any unnecessary tension. The idea regarding weight of the top rolls is a good one, although we think that you will find the trouble in the pulling lengthwise. It would be well not to run the goods during the scouring any longer than is necessary to clean them. Over-shrinking in length or width will prove troublesome, as the stretch in drying, if too great either way, will part the silk from the worsted. You must bear in mind that there is little elasticity in the rayon and something has to give way.

Factors Governing Character of Moire

In producing a moire effect on a gros grain or poplin by folding the fabric lengthwise or by running two pieces face to face, either through a calender or by means of the hydraulic press, what conditions determine the sort of design obtained? Fine lines are undesirable; broad splashes are wanted. Often two pieces from the same dye lot will give entirely different results. (5827)

The moire effect is governed by several factors. In order to get broad splashes, it is necessary to run the speed of pieces fast enough for this purpose, slow speed making fine lines. The pressure on the rolls must also be watched and also the tension on pieces as they come off the roll. The party doing the moireing must watch his effects and adjust the speed and pressure accordingly.

Bleaching Fabric Containing Figures or Stripes of Vat Colors

We are making goods here that have vat colors in them and have to bleach in the piece after they are woven. We are having trouble getting the goods white enough. Would you be kind enough to give me a good formula for boiling-out the goods so as not to injure the colors? (5902)

The writer has found that the best white on this class of goods is obtained by using the so-called tank bleach, that is, on goods averaging five to eight yards to the pound. A wooden tank, cylindrical in shape, is used, 7 ft. in diameter by 8 ft. deep, with wooden false bottom, lead-lined heating coil under the false bottom through which live steam is fed and trapped, with chlorine liquor storage below the bleaching kier on one side, and antichlorine liquor in a cement storage on the other side. Goods are first wet out in the singer and allowed to steep, after which they are rinsed through a 6 ft. washer, either slack or regular type, and loaded into the kier in lots of about 20,000 yds. Circulation on the kiers is through the medium of special lead-alloy centrifugal pump.

The formula for boiling out is $1\frac{1}{2}\%$ soap and 1% Oakite on the weight of goods. Boil for about 6 hours with pump circulating. Then wash down in two or three rinses from the water supply line, running through the pump to get

proper circulation. After this the goods are treated with chlorine liquor of a strength of 12 to 15 lbs. of chlorine to 1500 gals. of liquor. It will usually be found necessary to keep the goods flooded with chlorine liquor for about $1\frac{1}{2}$ to 2 hrs., after which they should be allowed to drain. Then wash down with one rinse in cold water through the pump and afterwards treat with a solution of bisulphite of soda made slightly acid with commercial acetic acid. This liquor acts as an antichlorine treatment and has no detrimental action on the vat colors.

After the treatment with bisulphite of soda liquor, goods should be pulled out of the Bennett kier, either through a slack washer or regular type washer, and are ready for finishing. The writer has found, during his own personal experience, that this method of handling the goods brings the finished fabric to the putting-up table with colors just as bright, or possibly brighter, than they were in the gray condition. I would suggest that the inquirer by all means eliminate the use of any sulphuric or muriatic acid for souring or antichlor, and eliminate also the use of soda ash or strong alkalies in the boil.

A great many concerns are attempting to obtain a bleach by passing the goods through a rope soaping machine, but our experience personally has been that satisfactory whites cannot be obtained except on very high-grade cotton, unless the goods are given a boil of a few hours with soap and cleansing chemicals. The Bennett type of kier mentioned for boiling these goods can also be used with equal success on a peroxide bleach.

Steam Supply for Processes

Our steam system consists of two boilers, 5 ft. in diameter by 14 ft. long, carrying 115 lbs. pressure. A 4-in. main from boilers is reduced to 3 in. in the boiler room, and again reduced to $1\frac{1}{2}$ in. in the dyehouse. From this $1\frac{1}{2}$ in. pipe we run a 1 in. pipe into each of the seven 6-string piece-dye kettles. Beyond the piece-dye kettles is one raw stock dyeing machine, one open raw stock kettle, and a wool dryer; into each of these the steam enters through a $1\frac{1}{2}$ in. pipe. We find that this arrangement does not give us sufficient steam for our dyeing operations and wool drying. Our machinery being all motor driven, we use steam for manufacturing purposes only.

We contemplate reducing the pressure by means of a reducing valve, from 115 lbs. pressure to 70 lbs., and running a 4 or 4½ in. pipe to dyehouse, from which we would run a 2½ in. pipe into dye kettles and wool dryer. Would this arrangement give us greater capacity for our dyeing and drying operations? In other words would not the increase of approximately 2½ the present volume of steam at the reduced pressure give better results than the present system? (5821)

The 4 in. main should run through the dyehouse. The last feeder to the wool dryer can be taken from the tee at the raw stock kettle if this is how the machines are arranged. It is good practice to back the steam up to kettles by proper sized mains. The present arrangement has 1.76 sq. in. area, while the outlets run up to 10 sq. in. The 4 in. main has an area of 12.566 sq. in. and all machines will have sufficient steam as it is not likely all the valves will be opened at one time. The size of the kettles is not given but the writer believes 1½ in. feeders will give a sufficient supply of steam.

“Long” and “Short” Dye Baths

I noticed in a recent issue of TEXTILE WORLD that you advised the use of a “long” bath in dyeing light shades with direct cotton colors. You also referred to the obtaining of heavy or dark shades by dyeing from a bath “somewhat on the ‘short’ side.” Please explain what is meant by the terms “long” and “short,” in reference to a dyebath, and the effect upon the results of dyeing. (5818)

The terms “long” and “short” bath refer to the ratio of the weight of color-containing dyebath to the weight of goods to be dyed. By a “long” bath we mean a bath where the ratio of dye liquor to goods is greater than 6 to 1; that is, a dilute bath. Often a bath will be as dilute as 20 to 1, as in the case of basic colors.

A “short” bath, on the other hand, is a concentrated bath and is considered such when the ratio of liquor to goods is from 3 to 1 to 5 to 1.

The long bath is used when dyeing with color which shows a great affinity for the fiber being dyed, and which, if dyed from a concentrated bath, would produce unevenness and mere surface coloration without proper penetration.

Basic colors would, in a concentrated bath, go on tannin mordanted cotton so fast as to prohibit their use because no levelness could be obtained. A long bath is commonly used also with colors, such as direct cotton colors, which are to be dyed to light shades. The long bath prevents unevenness, local light and dark places, and eliminates the long boiling so often necessary to level up dyeings with this class of colors.

The length of the bath greatly affects the shade obtained with direct cotton colors, since there is a point of equilibrium between the color on the fiber and the color left in the bath, which is always reached, upon continuously boiling the bath. This equilibrium is not affected by further boiling, since dye is dissolved off the dyed fiber just as fast as dye is taken from the bath by the fiber. This process is called leveling. Hence, with a long bath this point of equilibrium is reached much sooner than with a short bath, and leveling takes place more quickly in the former case.

Cockly or Curly Worsted Yarn

I am having a considerable amount of trouble with yarn curling, and am sending you a sample of the tops we are using, a skein of 2/26s in oil, and a skein of 2/26s after being dyed. You will notice that there is no sign of the yarn curling before the scouring process. We are under the impression that the 46s is causing our trouble. In the drawing operations we have 9 of a draft. Ratch on draw box $11\frac{1}{2}$ in., dropping one-quarter of an inch on each operation. Our drawing consists of six operations. Ratch in spinning $10\frac{1}{2}$; carriers well spaced; spinning from a 200 grain roving equalling 10.4 of a draft. We have tried making a heavier roving; also tried moving the ratch further back with no better results. Any information you can give me will be greatly appreciated. (5862)

The defects visible in the dyed skein are also evident in the undyed skein. The yarn is very uneven. The single is cockly or curly, and the 2-ply is full of places with spiral twist, caused by the twisting together of thick and thin places in the singles. These defects are accentuated in the dyed skein, due to the unequal shrinkages of the thin, hard-twisted places, and the thick, soft-twisted places. We scoured a small skein of the undyed

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yarn in a solution of soap and water heated to 120 deg. F. When scoured, the curly or cockly places were very evident, producing a similar result to that obtained in the dyed skein. We tested the shrinking property of both qualities of top, and as a result we believe that the 46s quality is not to blame. Both tops are of similar maximum staple, but the 48s top has the better average staple. The 48s is up to grade, of good staple, and alone it should make an excellent 26s to 30s counts. The 46s quality is kempy, has not a good staple, and in our estimation is not a good 46s quality.

Blend - 75% of 48s; 25% of 46s Qualities
Top = 5 Oz. for 5 Yds. Staple 10 $\frac{1}{2}$ In.

#1 Drawing Layout

Operation	Doublings	Draft	Wt. of 40 Yds.		Ratch
			Drams	Grains	
Can Gill	6	7	549	15,000	
Sp. Gill	5	7.25	378	10,350	
Drawing	5	8	236	6,470	10 In.
Weigh Box	5	7.75	153	4,173	9 $\frac{1}{8}$ In.
Finisher	3	8	57.2	1,565	9 $\frac{1}{4}$ In.
Rover	1	8.17	7	190	9 In.
Spinning	1	10	Counts 26s	19	?

#2 Drawing Layout

Operation	Doublings	Draft	Wt. of 40 Yds.		Ratch
			Drams	Grains	
Can Gill	6	7	549	15,000	
Sp. Gill	5	7.2	381	10,400	
Drawing	5	8.25	231	6,310	10 In.
Weigh Box	4	8	115.5	3,150	9 $\frac{1}{8}$ In.
Finisher	2	8	28.9	789	9 $\frac{1}{4}$ In.
Rover	2	8.25	7	191	9 In.
Spinning	1	10	Counts 26s	19	

Your drawing drafts are too high and doublings must be excessive as a result. A better yarn could be made out of this blend by reducing the drawing drafts all through the drawing, especially on the gill boxes. This means reduced doublings but the result will be better. We advise breaking the staple down to 9 or 9 $\frac{1}{2}$ in. Do not exceed a draft of 10 in the spinning. It might be necessary to use

a lower spinning draft, but we doubt it. Watch the twist in the drawing. Keep it as soft as possible, especially the roving. Do not have the carriers too open in the spinning. Run them as close together and as near the front rolls as possible so long as "cut rollers" are avoided. Too little attention, on coarse wools, is given to the condition of the top front roll covers, the pressure used on back and front rolls, and lubrication of roll bearings. Herein lies a fruitful source of cockly or curly and uneven yarn.

As a matter of interest, we submit two layouts to use on this blend. We favor the first layout because it will give a fuller, loftier, and brighter yarn for knitting. The second layout is arranged to give two ends behind the rover in order to produce a more even yarn. Production is better in the first layout. Six operations are all right, but you are using too many doublings and so your drawing drafts are too high. We should certainly try to get a better 46s top to blend with the excellent 48s top you are using. A cent or two a pound extra spent in quality or for better staple will make all the difference to yield of yarn, waste made, and evenness of yarn produced, so long as proper treatment is given the material in the drawing and spinning processes.

Rayon Stocking Crinkles at Ankle

We have secured a fiber stocking which does not crinkle at the ankle when stretched out. We have been trying to produce that effect but have been unable to do so. We are sending you two types of ladies' rayon hose, one of which you will note has a firmly knit ankle and which does not crinkle or look wavy when stretched in the ankle; the other one does have this undesirable feature. Any advice you can give us regarding how to overcome this crinkly or wavy appearance in the ankle will be appreciated. (5815)

If you will examine the length of stitches in the two samples submitted you will find that the stitch in the stocking which crinkles has a length of about twice as much in the ankle as you will find in the firmly knit ankle. First, we believe you will need to shorten the stitch in the ankle as much as you can. We believe this is all that is necessary to overcome the trouble, but if the wavy look does not en-

tirely disappear we recommend that you ravel and test the rayon to be sure you have the proper count. Both samples were knit on the same type machine and you should find it a simple matter to duplicate the good stocking.

Tight Rayon in Finished Cloth

Enclosed you will find a piece of corset goods composed of cotton with a viscose stripe. You will note that due to the fact that the viscose has shrunk more in the dyeing and finishing than the cotton, an uneven or crinkled effect has been obtained. Can you offer any suggestions as to how this objectionable effect can be eliminated? (5903)

An examination of the corset cloth with viscose stripe shows that the rayon stripe was woven under too much tension. Finishers who have experienced the same difficulty on goods of similar construction report that changes in the methods of processing the cloth have no beneficial effect on the final appearance of the fabric. Some finishers make it a rule to examine in the gray all fabrics having a viscose stripe, and if tight rayon is found, the matter is taken up with the mill which wove the cloth. The lack of elasticity of rayon is the cause of the crinkled effect and the only way to eliminate this defect is in the weaving.

Starching Flat Knit Cotton Tubing

Will you kindly furnish me with an outline of the different steps or operations that are best suited in starching flat knit (spring needle) cotton tubing? (5912)

The following method is giving very satisfactory results: For each 100 lbs. of cloth to be starched use 1 lb. of corn starch. Bring the required amount of starch into a thick smooth paste, free from lumps, by mixing in a pail with hot water. Then add this to a small amount of water, at a temperature between 120 and 130 deg. F., in any form of string machine. Run about three strings of the cloth through the diluted starch solution; allow cloth to drain, or extract it for not over 2 min.; dry, and then if desired run through a conditioning machine for removing wrinkles and giving the cloth the proper spread.

Kinks in Seine Twine

In making up a small lot of seine twine, we had a great deal of difficulty twisting the 4-ply as hard as it should be twisted without having the 4-ply kink. We were doing this work on a ring twister. Should seine twine be twisted on a ring twister or a flyer twister? Kindly give us all the information you can as to how to make this twine. (5778)

Perhaps bigger rings and slower speeds with heavier travelers may help to keep kinks out of the yarn. We understand that some plants making this type of material do use flyer twisters.

Garment Feels Soapy

We are sending a sweater which we scoured with olive oil soap and which we afterwards rinsed in hot water to remove the soap that remained in the garment. As you will notice, it still has a very soapy feel and this we would like to eliminate. We tried rinsing with lux and with ammonia, but neither process is satisfactory. Can you suggest any way of eliminating the soapy feel. (5939)

After subjecting the sweater to several tests, the writer feels sure that the soft and rather slippery feel is not due to soap. High temperatures to which the garment was exposed failed to bring out any pronounced odor, which would not be the case were soap present to any appreciable extent, since when soap is heated to a high temperature a very noticeable odor arises.

In the opinion of an experienced knit goods finisher to whom the garment was submitted, the soapy feel is caused by the high percentage of camel hair, or other soft, fine fiber used in making the yarn, and not to any soaps.

Due to the fact that naphtha removes this soapy feel to some extent it may be that there is some oil present which is unsaponifiable and will not be removed by the soap in scouring. It would be a good plan to examine the emulsion used for lubricating the yarn before knitting. See that no mineral oil is present and that only a soft soap is used. Olive oil and a good potash soap in the proportion of about 3 parts of oil and 5 parts soap are extensively used. This emulsion is easily removed in scouring and the material is left in a soft, smooth condition.

Finishing Artificial Flower Cloth

Enclosed are three small pieces of material. The glossy piece is artificial flower cloth used in manufacturing artificial leaves. One of the swatches has been washed with water. The cloth is dyed and filled on one side. Could you give me an approximate formula for finishing this cloth?

(5909)

A formula that has been used for finishing the prevailing green shade for leaf effects on plain sheetings is as follows: After dyeing, the goods are thoroughly washed and dried. They are then starched on a heavy 2-roll starch mangle with a mixture of 100 lbs. of white corn dextrine, 40 lbs. of tapioca flour, 2 qts. of 50% Turkey Red oil, 3 gals. of castor oil, all cooked together to make a finished batch of 100 gals.

After starching, fabrics are dried over regular cylinder drying machine, stretched on a 40 ft. tenter, conditioned, then taken to a friction calender of heavy construction and given one run on the face side. It is also found necessary on some shades to sadden the tone of the green shade in the finishing by the addition of 2 or 3 qts. of fustic to the starch mixture.

Softeners on Cotton Skein Yarn

Will you kindly give us information regarding the application of softeners on cotton skein yarn? A claims that softener should be used in bluing water; B disputes this, as there are three rinse waters after this process and argues that it should be put in final rinse. We would appreciate any information you could give us.

(5913)

There are several ways of applying softeners on cotton skein yarn, and A and B can both be right. It is all a matter of the handle and feel that are required. If A used a softener in the bluing water and finished at this point, his yarn would be apt to feel better than B's, depending on the amount used. B's way, we should think, would not give yarn quite so soft, and the shade of bleach would not be the same if equal amounts of bluing and softener were used and the yarn given three rinses after applying the softener and bluing. Still he would get a finish that no doubt would be satisfactory.

It is not necessary to give the yarn three rinses after bluing; the yarn should be thoroughly rinsed before bluing. The bluing water should be the last one, and at this point add the softener. This way we think will give you the best results.

Spinning Rayon Waste

Would you kindly advise on the following: (1) Whether or not rayon silk waste can be spun into single 1/24 cotton count; (2) As to whether 50% rayon waste mixed with 50% cotton hosiery clips can be spun into 1/18 cotton count. If this is being done would you kindly advise us what machinery is necessary to get this waste into yarns of the above counts. (5965)

(1) Rayon silk waste can be spun into 1/24 cotton count, but not to our knowledge on the cotton system of yarn manufacturing. (2) 50% rayon waste mixed with 50% cotton hosiery clips can be spun into single 18s cotton count, we believe, but it depends fundamentally upon the quality of the rayon waste, the quality of the clips, the condition of the machinery to be used, the quality of the humidifying equipment in the mill, and most of all, upon the man attempting to do it.

Referring again to question 1, the yarn might have to be spun on the Schappe or French worsted system, but possibly it could be done on the Bradford system. It is doubtful whether it could be done on the cotton system.

Referring again to question 2, only cotton machinery is necessary, but it would have to be changed to suit the circumstances.

Measuring Tape Wound Up with Cloth

Can you advise us who supplies a measuring tape printed on paper which is inserted in a piece of cloth and rolled up with it, to show the length or yardage remaining in the piece after it is cut? (5950)

The Perfect Measuring Tape Co., Toledo, O., makes such tape in lengths from 20 to 100 yds. The price is 7 cents per running 100 yds., irrespective of unit lengths. Where such tapes are used in this country, it is generally where firms have a foreign influence or have employees who are familiar with this practice abroad.

Grouping Silk Looms

Will you please inform me as to the advantages or disadvantages in mixing looms? What in your opinion would be the best and ideal way to line up the following types of looms?

103	.....	2 x 1
34	.....	2 x 1
42	.....	4 x 4
31	.....	4 x 4
18	.....	2 x 1

(5948)

It would be advisable to group the looms two 2x1 box and two 4x4 box together, so that in the event of using the 4x4 on fancy work the weavers will not be overloaded, taking it for granted that you run a four-loom system. The make of loom and head motion should not make any difference to weaver or fixer.

Trouble with Roll Coverings

I am having trouble with the leather on my rollers. I am sending you samples. It starts first in the middle and spreads the whole width of the roving traverse. If I run these rollers six or seven weeks, it comes to a smooth surface. I oil my rollers twice a week. My speed on my front roll is from 136 to 146 r.p.m. I keep my room anywhere between 63 and 65% humidity. My rollers are not covered here in the mill; they are sent to a roll coverer. The roller man says it depends on the spinners and I say it depends on the grain of the leather. (5963)

The probable cause of this trouble lies in the thickness, or rather in the thin quality of the skin. The nearer the outer edge of the skin the cot is cut from, the thinner it is, and the more liable to stretch and quickly work loose after being put on. It is possible to have this trouble by stretching new cots over old flannels that should have been removed.

One thing that adds greatly to the life of a cot is to have the full length stroke of the roll traverse maintained. For instance, if the stroke is only $\frac{3}{4}$ in., when it should be $\frac{7}{8}$ in., or 1 in., then all the wear comes within this short stroke. As a result, the cot becomes grooved and is soon worn out.

The writer has found that by making a systematic regular inspection of all the cots in use in the spinning frames, a great many loose cots are discovered to be running that ought to be removed. By going to the side of a frame and using the right hand, letting four fingers rest on the back edge of the clearer, and the thumb rest parallel on the front roll or cot, one can easily and quickly detect a loose cot. In going over a frame it is surprising how many will be found. This inspection can be done at the rate of one side per minute, or one can go over a room of 10,000 spindles in about one and one-half hours.

Treating Tram Silk for Throwing and Coning

Just recently we started to throw our own hosiery tram. We are soaking the skein in oil for throwing. After spinning ten thread, we use another oil for coning, and our silk is not as soft and pliable as it should be, or as soft as the silk we formerly bought on cones. Would you please let me know if you have to degum the silk partially for knitting? If so, please let me know how to do it. (5941)

Had this inquirer gone more fully into the details of his procedure, a more intelligent outlay of his faults could be given. The fact that the silk is not running well indicates one of two things: It is being given either a too harsh or a too mild treatment. In throwing tram silk, it is customary to soak it in the skein in hot water and soap (usually over night). This softens the gum or sericin and permits winding more readily.

The soap, since it is the prime factor in softening the gum and loosening the threads from each other, and since it must be used to facilitate winding, should be a settled variety of the best quality. A cheap soap of poor color will dry yellow on the silk, and consequently lower its quality. This soap should be made from olive oil or a very high grade of olive oil foots. Be sure there is no free alkali in your silk soap, as this will diminish the luster and harshen the fiber. It is also important that no free fats or fatty acids are present, as these are detrimental.

After being soaked, the skeins are washed, wrung out by hand, thoroughly hydro-extracted, unfolded, and dried. The silk is now nearly ready to be wound and coned. Previous to this operation, however, it should be conditioned to give

it softness and flexibility. For this purpose a good grade of olive oil or its equivalent should be used.

By taking pains that the soap and oil are of good grade for the work, a manufacturer should have no difficulty in doing his own throwing and coning. It must be borne in mind that this work cannot be done in a haphazard manner, but that as great pains are essential as in any other operation, such as knitting or dyeing.

Beady Finish on Cotton Duck

We enclose a small sample of cotton duck and shall be glad if you will tell us how the beady finish is obtained.
(5918)

The beady effect cannot really be laid to the efforts of the finisher except from a slightly natural shrinkage of width. The goods show a peculiar weave, with a two-ply fine yarn one way and a heavy single-ply yarn the other, which really would show a beady effect in the gray goods.

The fabric has evidently been backfilled with a solution of white pyroxylin, and may have been passed through a calender with two combination or cotton rolls and a middle iron roll wrapped with fabric. The backfilling has thrown up the heavy yarns to a certain extent, and the calendering with the face side to the wrapped roll has also assisted in keeping this pronounced beady effect in the weave intact.

Metallic Top Rolls in Cotton Drawing Frames

We understand that some cotton spinners use fluted top rollers in their drawing frames as standard, and we shall be obliged if you will give us your expert opinion as regards the advisability of adopting this type of drawing roller in preference to the leather covered. We spin coarse counts, 8s to 16s.
(5944)

Metallic top rolls are quite common today. They must be used with bottom rolls designed to go with them. This means a complete change of rolls, top and bottom, when changing from one to the other.

There is some difference in opinion as to the merits of metallic drawing rolls; but, as they have been in use long enough to be beyond the experimental stage, it is reasonable

to feel that, when properly used, they are quite practical. They must be used in the proper way, however, to obtain good results. The settings must be more open than when using leather top rolls. The weights are less and in the reverse order to those used on leather top rolls. They must be kept clean, which is not very different than with leather top rolls. The gears connecting each pair of rolls may need to be changed to keep the drafts in the proper proportion. The builders claim several advantages, the most prominent of which is "a greater production at the same front roll speed." This is a well justified claim, the production being up to as much as 30% greater than for leather top rolls.

Of course, there is no roll covering, but probably the initial cost would be higher than for a new set of common rolls, and these rolls will wear out in time. There is less weight on the rolls, which is supposed to be easier on the cotton.

With proper adjustment, there is no question but that metallic rolls can be used for the work which you specify and produce satisfactory results. Do not try to use them with the same adjustments and gearing that are satisfactory for leather covered rolls. If you care to send us a specific statement of the cotton used, the weight of sliver entering and leaving, the gearing of the frame, and the speed of the frame, we can give a more definite statement as to the changes to make.

Cloth Layout with Rayon Filling

Will you kindly let me know if cotton warp and rayon filling is figured the same as cotton warp and cotton filling? That is, to get the number of ends in warp. If I were to make a style 68 x 56, 39 in., with rayon filling, would I use the same method of figuring as for cotton filling? I understand there is not as much contraction in width if rayon filling is used. Would I have to use a different reed than 68 to make this style? (5935)

Many men make the mistake of figuring the warp ends wrong. It makes no difference what kind of filling is used with a cotton warp, or any other warp for that matter. The sley or ends per inch specified should be multiplied by the width of cloth called for in the specifications; the

product will be the total number of ends to use, less the extras for strengthening the selvages.

If the specifications call for 68 ends per inch in the cloth and the width of the cloth is to be 39 in., then 68 x 39, or 2652 ends, plus 24 ends extra for strengthening the selvages, gives the figure of 2676 ends for the warp.

There is not as much contraction when using rayon filling as when using cotton filling. Rayon is a stiffer thread and the cotton warp will have to do more bending than is the case when using cotton filling. But the amount the cloth will contract will depend largely on the position of the sand roll of the loom. If the sand roll is located near the fell of the cloth, as is the case on a Draper loom, the contraction of the cloth during weaving will not be so great as if the sand roll were located a greater distance from the fell of the cloth.

The contraction of a 68 x 52, 39 in., composed of cotton warp and 150 denier rayon filling, would be about $2\frac{1}{2}$ in., but there is no hard and fast rule governing this. It will depend on the location of the sand roll, the tension of the warp during weaving and the kind of warp used. But in no case should the number of ends in the warp be governed by the amount of contraction during weaving. It may be necessary to use a different reed, but the weaver or designer must always keep in mind that the contract calls for 68 ends per inch in the cloth, and if the cloth from the loom is found to be wider than the width called for, and the ends have been figured correctly, there will not be the correct number of ends per inch in the cloth.

Many inexperienced weavers or designers would make the mistake of taking out ends from each side in order to make the cloth width correct. This is wrong and is a very bad practice which is liable to lead to serious trouble, particularly if the buyer is fussy. It always leaves an opening for cancellation. It is far cheaper and safer to buy new reeds. A large saving can be effected by cutting down the width of the warp in the reed, for if the cloth is one-half inch too wide, cutting down the width in the reed for one-half inch would mean a saving of many yards of rayon filling in one yard of cloth.

Production of Winder on Silk

(1) If a winder, operating at an average thread speed of 150 yds. per minute, is stopped a total of $4\frac{1}{2}$ hrs. in a 50 hr. week, what is the production in pounds per spindle-hour, if the silk contains 300,000 yds. per pound?

(2) What is meant when a bale of silk is said to have an even titrage? (5914)

(1) At a speed of 150 yds. per minute, the winder would wind 9,000 yds. per hour provided there was no stoppage. As the stoppage is 9%, there would be a loss of 810 yds. in winding production, giving an actual production of 8,190 yds. wound per hour. Dividing this figure by the yards per pound gives a production per spindle hour of .0273. The following formula can be used: $(\text{Winding Speed} \times \text{Min. per Hr.} \times \text{Hrs. Machine is in Operation}) \div (\text{Yds. per Lb.} \times \text{Hrs. per Week}) = \text{Lbs. per Spindle Hr.}$ Substituting the figures we have $(150 \times 60 \times 45.5) \div (300,000 \times 50) = .0273$ lbs. per hour per spindle.

(2) Titre is the French term for size and is generally known as denier. A bale said to have an even titrage is one where the range of the sizing skeins is not over 5 deniers.

Finishing Tinsel Lace

We have an inquiry to finish laces (gold and silver) as shown by the sample. Will you please give us information about this gilt process as soon as possible? (5784)

The writer's experience with this particular branch of the textile trade covered a period of about four and one-half to five years in New Jersey, catering to the specialty finishing of embroideries and laces. It is our understanding at the present time that this class of work is all being made by stitching the tinselled lace on to a chemical crinoline backing. That is, the ordinary white cotton gauze, counting about 32 by 28, is bleached in the regular form and treated with an acid solution and dried under very low temperature so that it does not lose its strength.

These chemical crinolines are stretched on a so-called automatic stitching machine of Swiss manufacture, and the tinselled yarns or patterns are stitched on to these crinolines through the medium of the wellknown automatic type

lace-making machine in lengths of about 15 yds., and widths up to 72 in. and 84 in. wide.

After stitching the goods the loose threads are clipped and the fabric sent to the finisher. The finisher in turn subjects them to a dry high temperature, about 235 to 240 deg. F., in a drying oven or chamber which rots away or tenders the crinoline so that it becomes dust. The laces are then placed in a tumbling or dusting machine and the dust sucked away, leaving the stitched portion of the goods clean.

After this procedure, the goods are stretched on hand type pin tenters to the necessary width to bring the patterns into proper shape and the goods to the proper length. They are then run over a special laundry pressing machine, made by the American Laundry Machine Co., to raise the figured pattern. Some of this work is stitched on tussah silk backs instead of the chemical crinoline, the finisher in turn destroying the silk back through the medium of caustic soda. In this particular process, however, care has to be taken that other ingredients are properly used, such as bluestone and glycerine, to prevent the tarnishing of the tinsel yarns.

To state the case frankly, this process is very hazardous from the standpoint of tarnishing the tinsel or metal yarns, and we believe that very little of such processing is done at this time. The treatment with alkalis and chemicals is naturally thorough saturation with liquors, and washing must be resorted to after the chemical treatment to remove all traces of the alkali.

This is accomplished in rotary type laundry washers after which the goods are extracted in centrifugal type machines, from where they are dried on the same type of pin frame as previously mentioned, and afterwards passed through the laundry pressing machine.

The writer would recommend that the inquirer should not attempt to do anything with this class of merchandise until he first secures the services of an experienced man, as the goods are very valuable and expensive damages result from improper treatment.

Yarn Dyed by Random Process

We are enclosing herewith a sample of yarn, part of which is dyed red and part black. We should like to know how this was done. (5897)

The sample is a 2-ply woolen yarn and has undoubtedly been subjected to the process known as random dyeing. This treatment consists of dyeing one portion of the yarn one color and another a different color. It is carried out in several ways, of which the more common are: (1) Tightly tying skeins of yarn in one or more places and dyeing the material at one side of the tie with one color and at the other side with another. (2) Printing the color on to the skeins which are spread out on the blanket of the printing machine. (3) Placing cones or packages of the yarn on a suitable hollow spindle, piercing the yarn with an air-operated punch, and drawing dyestuff through these pierced holes by suction. (4) Piercing the yarn cones or packages with an injecting needle (similar to the surgeon's hypodermic needle but much larger) and forcing the dye liquor into the yarn through the needle.

In the latter two cases the dye is absorbed by the yarn immediately surrounding the punch or needle, as the case may be, and a hit or miss coloration is formed on the yarn. The yarn may be knit directly from the cones on which it is dyed, without rewinding.

From the appearance of the yarn sample, the writer would say that it was first dyed red, then wound on cones and lastly dyed by either (3) or (4) with a black dyestuff.

Glue for Sizing Mixture

I would like to know if there is a glue, which when used in a sizing mixture, will become hard enough so as not to give a sticky feel to the product on which it is used. Or is there some means of so treating this mixture that one can still get the full benefit of the glue and yet destroy this sticky character of the finished product. I trust you will be able to give me a speedy solution to my difficulties. (5788)

The glues generally used for adhesive qualities and which must set hard are the animal glues, and known as cold glues. These glues are soluble in hot water, but when the

water has evaporated the glues become hard and do not have the sticky character present in fish glues, etc. When this glue has lost its moisture it becomes quite dry, hard, and somewhat brittle. If too brittle, glycerine could be added to make it more flexible. These grades of glue can be cut cold with acetic acid, which keeps the glue in the liquid state. When the glue is desired to be waterproof, a small amount of formaldehyde is added. The writer would suggest trying a grade of glue called "bonnet glue." These grades of glue are also called "flake glues."

Yardage from the Loom—Shrinkage When Tension is Removed

In order to determine the correct shrinkage of our worsted and woolen goods, and also for calculation and efficiency purposes, we would like to have some information on how to get the correct yardage of gray goods the weaver has actually woven. It is a known fact that certain goods, like poplins and bolivias, shrink considerably as soon as they are off the looms, and when measured on a machine in the loose condition, the yardage thus obtained is much less than the actual yardage woven and required for calculation purposes. All measuring rolls that we know of do not stretch the goods and the looms are not equipped to show yardage of cloth. Any information will be greatly appreciated. (5781)

A superintendent of wide experience replies to this question as follows: I have been trying to locate somebody who had used or had heard of any method whereby the exact shrinkage of a piece of cloth could be determined beforehand. But I have been unable to find anybody that ever heard of such a formula; neither have I ever seen one used. I always considered the yardage after the cloth is woven, laid on the floor for half a day and then measured, to be the basic woven yards, and any loss I figured as take-up the same as you would figure your take-up in the loom.

In my estimation there is no way of determining the exact shrinkage of cloth except by practical experience. The nearest to getting the actual yardage a weaver has woven would be by a pick counter. There are too many factors that may give you a different shrinkage, such as climatic conditions, twist of yarn, method of spinning, weights on

loom beam, stock, sizing, preparing the warp, and the peculiarities of the weaver. Any one of these might give a different result than anticipated.

Crompton & Knowles Loom Works sends the following: We would suggest that the loom be equipped with a pick counter. As the number of picks per inch is predetermined in the fabric which is being woven, the total number of picks in the piece of goods can easily be determined by readings on the pick counter, and from this the actual yardage can be obtained.

Cleaning Wool Cards

Would you kindly advise us regarding card cleaning? We are running cards on batches consisting of 50% wool and 50% wool shoddy; also batches of 50% wool and 50% cotton. In your opinion how often should our cards require cleaning? (5772)

With proper working fancies the breaker should run at least two days in succession without cleaning, depending largely on the quality and condition of the stock. The finisher and ring doffer should be cleaned daily.

Dyeing Rayon Jersey Cloth

We are making tubular cloth or jersey cloth in artificial silk on spring needle machines and we are very anxious to commence dyeing this into any required shade for the retail trade. Could you give me the following information: What process is used for taking out the oil that is applied to the rayon before winding and knitting? Also what kind of machinery is required in rotation to turn out good and first class work? As we are new to this class of work, we would appreciate any close information you can give us. (5647)

Different oils and mixtures of oils are used in preparing rayon for knitting. These should be of good grade so as to be easily removable in the scouring process. Neatsfoot is classed as a non-drying oil but when applied to rayon and allowed to lie around in the air for some time, oxidation will take place to a certain extent. If the fabric is scoured within a few days after the yarn has been oiled, very little trouble will be experienced in the scouring operation, but if the rayon is allowed to remain in the oiled state for a

considerable time, a great deal of difficulty will be met with in removing the oil. It can safely be stated that when the oil has been allowed to oxidize and harden on the yarn, two or three times as much processing will be necessary to get the fabric clean as would have been the case had it been scoured immediately. This means a corresponding increase in the cost of scouring agents and additional wear upon the fabric itself.

In order to illustrate the method of scouring, let us take, for example, six rolls of tubing with a total weight of 150 lbs. These rolls may be washed in an ordinary six or eight string washer, equipped with squeeze rolls. The squeeze rolls should be wound with cloth to prevent fraying. For the first scour dissolve 7 to 8 lbs. of soda ash in about 350 gals. of water, and run the rayon in the bath for a half hour at a temperature of 160 to 180 deg. F. This treatment will remove the greater part of the oil. For the second scour use 7 to 8 lbs. of a good olive oil soap and an equal amount of tri-sodium phosphate, and run for a half hour at the same temperature as above. This soap scouring removes the last traces of the oil and imparts a soft feel to the fabric. The purpose of the sodium phosphate is to assist the soap in removing the last of the oil. In some cases it may be possible to cut the scouring process down to one operation, but generally speaking, better results will be obtained in two. The scouring process just given will remove the oil and dirt and leave the rayon in a clean soft condition, provided that the yarn has not been lying around in the oil for any length of time before scouring. When hardened and oxidized oil is met with upon the yarn, it will be necessary to increase the number of scouring operations. The following process has been found satisfactory:

The first step is the same as above—a half hour in 7 to 8 lbs. of soda ash at 160 to 180 deg. F. Then follow with a treatment for the same length of time with 15 to 20 lbs of tri-sodium phosphate and 2 to 3 lbs. of soda ash at the same temperature. The final soaping is the same as before.

For light shades, it is usually necessary to give a light bleach before dyeing in order to give brightness. Medium and dark shades may be dyed on the unbleached bottom. Bleaching may be done with sodium hypochlorite. A good white may be obtained by running the rayon for one-half

to three-quarters of an hour in sodium hypochlorite of a strength of about 1 gram of active chlorine per liter. This treatment is followed as usual with a wash and an anti-chlor. The rayon is then ready for dyeing.

There are several manufacturers of dyeing and scouring machines for handling rayon in the piece. The Rodney Hunt Machine Co., Orange, Mass., build rayon piece dyeing machines, a description of an 8-string being as follows: This machine would have 3 bar 36 in. diameter folding reel, and would have 10 in. diameter squeeze rolls.

Drive: Located on either side of machine as desired—simplex friction clutch and pulley.

Reel: Wood drum construction, folding reel, 3 bar.

Reel Bearings: Standard.

Lining: Dressed from 3 in. cypress stock.

Squeeze Rolls: Driven by chain, 10 in. diameter.

Unloading Doffer Roll: Belt driven, located on front of machine.

Guide Board: Wood pins for 8 strings.

Drain: 3 in. brass cone seat and plug threaded for standard connections.

Front Partition: Slatted.

Fittings: Iron.

The Van Vlaanderen Machine Co., Paterson, N. J., put out their single dye reel, type 391, which consists in general of four units: A wooden tub, a large oval reel, a motor reduction box unit, and a small wooden idler reel. The tub is made of 3 in. cypress with a perforated color partition in which is a perforated brass pipe for boiling up by steam. The large oval reel is made up of bronze heads mounted on a steel shaft covered by copper tubing. To these heads are fastened the hardwood slats. This oval reel is supported on one end by a swivel bearing. This swivel bearing allows of self-adjustment so that the reel is always kept in perfect alignment should the tub for one reason or another warp. The other end of the reel shaft is supported by a ball bearing which is set in the reduction box housing. The speed reduction unit consists of a steel worm and a worm wheel of special gear bronze. Both the worm and the worm wheel are run in ball bearings. The reel shaft is connected to the worm wheel by a clutch which is operated through the vertical shaft and links by the hand lever at the side of the tub. With this clutch arrangement the

machine can be stopped without stopping the motor. To this hand-operated lever is attached an automatic stop motion. If the goods in some way become knotted, it catches between the sticks on the rake boom, throws it up and automatically disengages the clutch, thereby stopping the machine.

The idler reel is similar in construction to the large reel. It runs in ball bearings and is perfectly balanced so that there is no tension whatsoever on the goods. It is this feature which makes it so suitable for delicate fabrics. The machine is made in sizes ranging from 3 to 10 ft. in width. The other inside dimensions of the tub, such as the length, 9 ft., and the depth, 30 in., remain constant for all sizes. A 3 ft. machine will accommodate 6 strings.

The Utica Novelty & Mill Specialty Co., Utica, N. Y., put out rayon piece dyeing machines which are made in various sizes to handle batches from 60 to 500 lbs. Their machine is built of clear cypress, has a convex back which is properly splined, also is fitted with a round or oval reel as desired, has hardwood idle roll, parting and slat rack, bronze outlet and plug, perforated brass steam pipe, etc.

Broken Rayon in Infant's Stocking

We are enclosing an infant's stocking made of rayon and mercerized cotton, and would like to have you kindly advise us what caused the rayon to break away near the heel while the rest of the stocking is in perfect condition.

(5920)

The rayon in this stocking has the appearance of having been broken in the finishing. The leg rayon is broken as well as the foot rayon, and, as these are run on separate machines, it is not likely that both would be giving trouble in this way. The trouble appears in the back half of the stocking only, and so is not likely to be the result of knitting machine trouble.

The trouble is more conspicuous on the plain foot because the rayon is plated on the outside and practically covers the cotton. On the rib leg, although the rayon is plated on the outside, the cotton comes to the surface more and so tends to prevent some breaking of the rayon. We would suggest that you investigate each operation after knitting.

Bare Spots in Terry Cloth

We are sending two samples of terry cloth. No. 1 is part of a three-width wash cloth; No. 2 is a sample part of a towel. We have a lot of trouble in preventing the terry loops on the under side from showing bare spots, or what we term "pock marks." The samples clearly show the bare spots and we are desirous to know what may be the cause of producing these bare spots. These spots only appear on the underside of the cloth, as the cloth is on the looms, and the samples are tagged on the underside to show the defective side. In reality, on the loom the sides of the samples with the tags are on the underside. The analysis of yarns and construction of sample No. 1 is as follows:

Terry warp 20/1, two in a heddle, sized medium. Body warp 40/2; filling 10/1; reed 24; pick 45 to 46. Example No. 2 is the towel portion. Specifications are exactly the same as on sample No. 1 with the exception that the body warp is 30/2 instead of 40/2.

We would be pleased to know whether the cause of this trouble is the nature of the yarn or does it appear that there is something wrong in the equipment of the loom which might cause it. Possibly the yarn is not properly beamed. We have a lot of trouble of this kind and in many cases the bare spots are of much larger areas than in the samples submitted. We have goods coming off at times with areas 3 to 4 in. wide, and the entire length of the towel having these bare areas and in all such cases the terry does not appear on the underside and causes the bare spots. But it appears on the top of the cloth, making the top of the cloth much thicker in terry loops than the underside. We would highly appreciate any information. (5731)

It is rather difficult to determine just what causes the pock-marked condition of the terry cloth samples. More information should be given as to the kind of equipment used, how the warp is drawn in, whether the terry warp is mechanically controlled or just allowed to run in from a slack warp.

The pile that should be on the back of the cloth is weaving on the face. It looks as though the terry warp was not under proper control. When the harnesses, carrying the back loop ends, go down to the bottom shed there is not enough tension on the yarn to carry the ends full down to the bottom and these ends that make the back pile loop are forced to the surface of the cloth.

The yarns appear to be satisfactory. If the pile warp

is not drawn in the front harnesses it is drawn in wrong. When drawn in the front harnesses the ends are nearer the fell of the cloth and this gives a snappier shed.

The movement of the reed, when pushing the pile or third pick up to the fell of the cloth, always favors the top pile. This movement is a forward and slightly upward movement and it has a tendency to push the yarn in the reed dent upwards. Every precaution should be taken to see that the back pile yarn is on the bottom shed when the third pick is inserted and is pushed up to the fell of the cloth.

In the absence of more information this is the best solution we can offer.

Roving Matted on Spools

We are running straight worsted garnet, about $\frac{1}{4}$ blood, and experience considerable trouble in the roving matting on the spools. Would like to know if there is an emulsion we can use or what we can do to condense the roving harder. It runs good on the card, spins good on the draw, but will not come off the spool because matted. We are using lard oil emulsion at present. This is spun 12 cut.
(5798)

Use an emulsion of 75% oil to 25% water. Set the condenser stroke as short as possible and speed up the condenser. Wind the roving on the spool as tight as possible. Shorten the vibrator so that it will not overlap on the spool.

Dyeing Three-Fiber Hosiery

Will you print on the Question and Answer page the different ways that the mills do their dyeing on three-fiber and pure thread silk hosiery, in rotary model machines, starting at the boil-out. Please indicate the different chemicals used.
(5810)

There are two methods in practical use for the dyeing of three-fiber and pure thread silk hosiery: degumming or boiling-out in separate baths; and degumming and dyeing in the same bath. The procedure of degumming and dyeing in separate baths is more widely used, is more foolproof, more economical (chemically), produces less seconds or re-dyes, and the dyeing is easier to control.

It is claimed that the degumming and dyeing in one operation requires less time and gives a better finish. It

is the writer's opinion that on an average this method requires more time than the first mentioned process, since a recipe cannot be standardized, due to the sensitiveness of the various dyestuffs to the varying degrees of temperature (in a soap bath). For instance, a formula is worked out today and this same formula used tomorrow may be far off-shade. This is due to either more or less condensation from the steam, a more rapid raising of the temperature, or a more vigorous boiling. In a neutral bath these variations have practically no noticeable effect unless carried to extremes, but in a soap and alkali bath such as used in the one-bath method, these variations will cause variations in the dye shade.

Another point of interest is that in a soap bath the so-called union colors will usually dye the cotton or mercerized cotton heavier than the silk, and this will necessitate the addition of acid colors to the recipe. It may also be necessary to do this in a neutral (two-bath process) solution, but where this is the case, it will require about twice as much of these colors in the soap bath; so that the degumming and dyeing in separate operations also has the advantage of being more economical in the use of dyestuffs.

As regards the finish, there is no real argument in favor of the one-bath procedure, for the finish will depend upon the length of time the hosiery are in the machine. The following are the chemicals required in the dyeing of this class of hosiery:

One-bath method—A good grade of soap or degumming oil, glauber salt, neutral softener.

Two-bath method—Degumming bath; a good soap and silicate of soda. Dye bath; neutral sulphonated castor oil, glauber salt, neutral softener.

Printing Narrow Elastic Web

Can you give me a formula for printing a blue or scarlet by the intaglio method that will be fast to washing, without having to give an after-treatment to fix the color, or make it fast. I am printing narrow elastic web and find that by having to give a fixing bath, I cannot meet the other fellow's price. I have been told that it can be printed in fast colors without any after-treatment. Any information will be greatly appreciated.

(5735)

A printer of cotton goods replies to this question as follows: I believe the best method by which to proceed is to employ pigments, either regular pigments or basic lakes, most of which are more brilliant than the strictly inorganic ones, using as a vehicle and fixing agent combined a solution of (1) nitrocellulos dissolved in alcohol and ether, or (2) cellulose acetate dissolved in acetone, or (3) bakelite dissolved in acetone. The first would be most volatile and fix quickest; No. 2 coming next, and No. 3 giving the fastest result. No. 1 would in all probability be fast enough for your purpose. These colors can be made in any consistency you desire by using more or less solvent. Grind or thoroughly work the pigment in by stirring to form a smooth paste. The pigments used must be either dry powders or alcoholic pastes; water pastes will not do as the water will cause the cellulose to be thrown out of solution. Drying on cans or in a warm room will be sufficient to properly fix the pigments.

You can either buy the cellulose solutions or make them yourself. We use similar things for printing gold metallic effect in very large quantities, with good results.

There is one more possibility that comes to my mind. Du Pont puts out a line of colors called "Gallopont" colors. They are soluble in formic acid, and do not require steaming. They are usually fixed and washed, but it might not be necessary.

Sample color, 8 oz. standard

4 lbs. Gallopont
 4 pts. Glycerine—stir well
 4 pts. Water at 140 deg. F. Stand a short time and add
 16 pts. Gallopont solvent; allow to stand 1 hr. to dissolve,
 strain out any residue and mix into
 5 gals. acid starch paste
 —
 8 gals.

The bakelite solution is made as follows:

8 parts by weight phenol
 12 parts by weight HCHO

This mixture is heated in a steam jacketed kettle at 90 deg. C. for 4 hrs., stirring constantly. This forms a white iridescent mass of a rather thick gummy nature, which is

mixed or diluted with an acetone alcohol mixture to give a vehicle of good flowing properties. Pigment mixed into this, printed and hung in a dry room, is fixed very permanently. The bakelite is a patented process.

Weaving Poplin

We are running poplin 84 by 44, 26½ in., 6.30, using 30s warp and about 25s filling, and are having quite an amount of trouble in making the weave run. Is this weave a difficult one to run, or rather should it be? Before making this weave we were running print cloth of about 48 by 48 construction, and made no changes in the settings of the looms when we put the poplin on. Please give us information in regard to sizing the warps, the distance from the fell of the cloth the reed should be when the harnesses close, elevation of the whip roll, and any other particulars that should be known and used in producing this cloth. (5695)

Poplins are not the easiest fabrics to weave, particularly when using carded yarns, but the poplin in question should not be a difficult one to handle for the sley is not very heavy and the 30s warp should weave good on the construction given.

The warp should be drawn two ends per dent in the reed. If only two banks of drop wires are used, the ends should be drawn in the drop wires in the following manner: The end from No. 1 harness and the end from No. 3 harness should be drawn in two wires that lie in the same bank, next to each other. The end from No. 2 harness and the end from No. 4 harness should be laid next to each other in the next bank. This is what is termed leasing in the wires two and two. When the warp is wired in this manner the yarn will not knit behind the banks.

Although the pick is low, the warps should receive much better sizing than the warps that were used in the print cloth construction. It is common practice to raise the whip roll, throwing the warp out of line with the breast beam. This is done in order to place cover on the cloth. It is not wise to carry this practice to extremes on account of the strain that is imposed on the bottom shed, making one-half of the warp carry the entire strain of the weave on every pick.

A construction of this kind requires the harnesses to be

set so that they will close early, but not too early. The timing of the cams will depend largely on the type of cams that are used. About one and one-half inches from the fell of the cloth would be a very good setting for this cloth.

If the above advice is followed strictly, and the warps should continue to weave badly, it is safe to say that the cotton stock used in the making of the warp yarns is not as good as it should be.

Rayon on Warp Knitting Machines

Kindly advise us if artificial silk can be used satisfactorily on milanese and tricot warp knitting machines. (5731)

A mill man replies to this question as follows: The writer has been engaged in work in the process of which an entire plant has been changed over from 28 gauge glove silk to various types of rayon, with success. There are several important factors, however, and the first is the condition of the machines. If the winding, warping and knitting equipment has been handling pure silk, especially in the gum, the working parts are liable to be cut or roughened and so in very poor shape to take care of rayon. In winding, the guides should be absolutely smooth and clean, the spools preferably made with fiber heads and also smooth. The holes in the warping brasses must be free from nicks and burrs, and the insides of the knitting machines should preferably be new. Other details depend largely upon what type of work it is desired to undertake, the size and kind of the yarn, and so on.

Tricot machines will handle on two bars 100 denier yarn with success. Coarser than this is not advisable for two-bar work, but 150 denier yarn can be readily knitted if only one bar is employed. On the milanese machine it is exceedingly difficult and not practicable to run anything over 50 deniers in size. Considering the difficulty in handling in the winding, etc., such a comparatively fine rayon, milanese work so far has not been entirely satisfactory, although there is no doubt that it will be in the course of time. Patience and ceaseless experimenting will solve most of the problems which will come up. Specific details cannot be discussed here, but the writer will gladly answer further questions.

Grease Stains in Filling of Crepe de Chine

I have recently had trouble with some dyed lots of silk goods which showed what appeared to be grease in the filling. The goods in question were dyed up in washable pastel shades, which allowed the grease marks to show through, and it is the opinion of the writer that the goods were not properly boiled-out, or that the proper ingredients to cut the grease were not used in the bath. I enclose herewith a sample, showing the defects in question. The cloth is constructed on a 60 reed, 2/3 ply, with 76 picks of 4-thread crepe, twisted 60/65 turns. I would appreciate your opinion in the matter, and your advice as to the best way to overcome the difficulty. Can this be taken out after the goods have been dyed and finished, or must we resort to redyeing same into darker shades? Being a washable crepe, it would be preferable to keep goods in the lighter shades, but the defects must be eliminated. (5801)

Our advice is to have these goods redyed into a darker shade, as there is no practical way of getting the grease spots out after the goods have been boiled and dyed. We would suggest that you take this matter up with the throwsters, cautioning them to be more careful in throwing. Tell the dyer in the event of imperfections of this kind showing up that the goods must be given a heavier boil-off.

Finishing Fine Count Shirting

I am enclosing herewith samples of fine count shirting and would like to have information showing the methods to produce this finish. (5658)

The inquirer does not state whether this fabric is woven with bleached yarns or is made in gray yarns. It is, of course, customary to make this particular class of merchandise from gray yarns and have the fabric singed and bleached in a regular finishing plant, using either peroxide bleach so as not to affect the colored stripe, or otherwise a modified alkali bleach with a very mild bleaching reagent commonly known as soda chemic. It is necessary of course as a rule to give an after-treatment if chlorine or soda chemic is used as a bleaching agent, this after-treatment consisting of passing through a bath of hydrosulphite to bring up the colors.

After bleaching and thoroughly washing, the goods are

dried and should then be ready for finishing over a range consisting of 2-roll starch mangle, six drying cylinders, 90 ft. tenter with hot air drying system and housing, and winder. All of these goods require in the way of a finish about 7 to 10 lbs. of white corn dextrine, with about 10 lbs. of good grade softener and the necessary blueing to tint the white. This mixture is made up into 100 gals. of starching liquor.

Goods should then be slightly conditioned and given one run on a 5-roll calender with two chilled rolls and three combination rolls. After this process they should be allowed to cool and then are ready for putting up.

Mixing Rayon and Worsted

Can you give me any information as to the best method of mixing artificial silk and one-quarter blood, or 50s quality wool, 50/50 mixture? Will regilling the artificial silk injure it in any way? What kind of drawing machinery will give best results? Any information will be much appreciated. (5663)

The best method of mixing artificial silk and one-quarter blood wool is in top form. If a 50/50 mixture is desired, put up the same number of ends back of the first preparer gill box and gill as for straight worsted. Then put the product of the first preparer through the second preparer in the ordinary way. Recomb and put through finisher gilling and put up in top form.

If such an even mix is not required, the mixing may be done by putting through three series of gillings. This, of course, does not make anywhere as even a top, but it has the advantages of not losing the extra noilage which, of course, occurs if the stock is recombed.

If the inquirer wishes to mix the artificial silk and wool in stock form and spin on the woolen system, the best place to mix it is in the batch as for all woolen stock, making the layers thin and being very careful to take from the side of the pile as it is put through the preparatory machinery.

Regilling artificial silk certainly will injure it somewhat, cutting the stock or making neps. Skill in handling, however, can reduce this injury to a small degree.

In answer to the question as to what is the best type of drawing machinery to give the best results, it is impossible

to answer unless the kind of stock used, and the method by which the yarns being spun is definitely known.

There have been a great many people who have endeavored to mix artificial silk with wool without taking extra care, and invariably it has brought trouble and spoiled stock. Only by the best of experience and painstaking effort can a result be obtained which will give not only a good yarn but a minimum of waste.

Holes in Gore of Heel and Toe

I am having trouble with some plain and transfer machines making holes in the gore of heel and toe; also on other makes of machines. Can you advise me how to cure this? With a view to assisting you in advising me regarding this trouble, I am mailing a sample sock, and will be obliged for a prompt reply. (5683)

The sample shows a break at the heel gore and at the toe gore, each one needle only, but on different needles. This would indicate that it was not a bad needle.

The yarn in this hose is woolen, is quite inelastic, and naturally has places which are weaker than the average. As the gores are places where the yarn is subjected to the greatest strain, it seems quite likely that a weak place in the yarn might not be strong enough or elastic enough to stand the strain and break in the gore.

When received, the stocking seemed very dry. Perhaps conditioning the yarn or the knitting room would help; not by making the yarn stronger, but by giving it a greater elasticity. To give a more direct answer, one should see the machines in operation.

Streaked Hosiery

We are enclosing you some silk half hose that are streaked. They were dyed in a rotary dyeing machine. Can you give us any idea as to what the trouble is? (5656)

From the appearance and feel of these hose, we would say the whole trouble lies in the fact that they have been too long in the dye bath. Possibly they are redyes, as they are of different shades. If so, the prolonged boiling and working in the bath would cause this cloudiness and streakiness. Cut down on the boiling time, or better still, dye at a temperature of 190 to 200 deg. F. An excess of salt in the bath will also cause cloudiness.

Finding Percentage of Profit

We are having an argument with reference to finding the percentage of profit; that is to say, the proper method, whether to figure the same on the selling price of the item or the cost price. If you will give us your experience in this matter, we will appreciate it very much. (5662)

A cost expert who is also a textile manufacturer replies to this question as follows: Either method is, of course, correct, depending on what you are talking about. When a man says, "I sold a horse for \$200 and made 100%," he means 100% of the original cost, or \$100. If, on the other hand, a business man says he did \$100,000 worth of business and made a 10% profit, he normally means that he made 10% net on his gross business, or \$10,000.

In our own business we figure and speak of our profits in percentages of gross business, which is the same thing as selling price. In other words, if we say that we make a 5% profit for the year, we mean that the cost of our goods and the expense of doing business consumed 95% of our gross income, and that 5% of this gross was left for profit.

In figuring our selling prices we use the same method, determining what percentage of profit we should expect on the selling price and then calculating this selling price from the cost.

This is a little more difficult mathematically than adding a definite percentage to the selling price and, as a matter of actual calculation, we multiply the selling price by the factor which gives us the percentage required on the selling price. For example, if we wish to make 10% on the selling price of an article, we multiply the cost by 1.111 plus. If we wish to make 20% on an article we must multiply the cost by 1.25.

The method of getting this factor is to subtract from the 100%, representing the selling price, the desired profit, say 10%. This leaves 90% of the selling price as representing the cost. In order to determine what factor the cost must be multiplied by to get the selling price, divide 100% by the percentage representing the cost. In this case this would be 100 divided by 90, equalling 1.111 plus.

Knitting Hard Twist Yarn

We are sending you two samples of yarn. No. 1 represents our regular twist yarn to knit 4 to 1 cut for men's heavy underwear. No. 2 is a knit fabric in grease. No. 3 is a finished cloth. This makes a soft underwear cloth but it does not give the consumer the wear desired. Now how can more twist be held in this yarn and still have it knit well? No. 4 represents a yarn such as it is believed will give a much greater wear to the consumer, but the problem is how to knit it, it being so active as to throw back the latches and make drop stitches and bad work. We would be very pleased to have suggestions from you or your friends. (5653)

It is the writer's opinion that if the inquirer wishes to put more twist in his yarn, the trouble in knitting it could be overcome by the use of steam. This could be applied by building a plain wooden box, with a door which would close tight, the box being big enough to hold one or more baskets of yarn. Bore a hole in the top of the box and run through this hole a steam pipe, about 1 in. in diameter, with a valve arranged so the steam can be turned on and off quickly. Another hole should be made in the bottom of the box so that the water which accumulates can escape. Place the yarn in this box and steam it for a period of from 5 to 10 min., or longer if desired.

Treatment of this kind should remove the kinks from the yarn so that it could be knitted without trouble with drop stitches. The writer has experimented with sample No. 4 in this way. Some of the kink has disappeared from the yarn, but if it is still too kinky, more could be removed by another treatment.

Strength and Elongation of Thread Yarn

We are sending you four sample tubes of combed American thread yarn, reverse twist, counts around 34s, 3-ply. The sample of yarn on the small tube is a sample of what we have been buying in skeins already twisted. We now propose to buy this yarn in the single, and do the twisting ourselves. We therefore had samples of this quality sent forward in the singles on spinners' bobbins, and after twisting these we find a difference in this respect; the strength of the yarn which we twisted was greater, but the elonga-

tion was very poor compared with the yarn we had been buying already twisted. We would be very pleased if you would let us know your opinion as to what is the cause for such a reduction in the elongation of the thread twisted by us. (5779)

We have examined the yarns, especially for the amount of ply twist, and find a considerable difference between the purchased product and that which you made. The ply twist was counted in ten inch lengths, ten tests for No. 1, and five tests each for Nos. 2 and 3. Ten tests were made on the purchased thread.

The following table gives the results obtained, the last line representing the average ply twists per inch. All these yarns had "right-hand" ply twist; that is, the twist slants upward to the right.

Ply Twists per Inch			
1	2	3	Purchased
182	201	210	166
182	204	214	170
192	207	202	169
207	200	199	172
215	205	202	178
193			164
202			164
206			161
203			159
189			166
19.71	20.34	20.54	16.69

Without investigating further, as for example the single twist or the staple, this variation in ply twist might easily account for a difference in breaking strength and elongation. In each of the numbered tubes, the ply twist is greater than in the unnumbered tube. It is very reasonable to think this would give a greater strength.

While it is reasonable to feel that the ply twist variation will make a difference in the elongation at the breaking point, the variation shown in the figures submitted is not what other data we have available would lead us to conclude. Up to a very high twist, an increase of ply twist would be expected to give an increase in elongation at the breaking point. In the figures submitted, the reverse is the case.

However, the difference in twist may account for this elongation variation as well as the strength variation. It would be well for you to try to duplicate the twist used in the purchased yarn and to ascertain if the single yarns used are exactly the same in size, twist and staple.

Lining Sulphur Bleach House

Could you kindly let us know what the proper material would be to line a sulphur bleach house? We understand there is some kind of a gum preparation which some use for this purpose. We have been having a great deal of trouble with our bleach house on account of the sulphur eating the nails away. We also plastered the inside and found that the sulphur fumes pulverized the plaster and it came off. Any information you can give would be much appreciated. (5749)

L. Sonneborn Sons, Inc., New York, reply to this question as follows: If a black color is not objectionable, we recommend our hydrocide 889. This coating would resist sulphur dioxide. If color is of some consideration, we recommend an aluminum paint with our clear acid blue varnish. The aluminum paint may be furnished either ready mixed, or the vehicle and the aluminum powder separate. A prominent finishing plant and a rubber plant tried this aluminum paint, and both reported very successful results.

After the above had been printed the following information was received:

Referring to Question and Answer No. 5749, regarding sulphur bleaching, in your issue of May 15, we beg to suggest a way of constructing sulphur bleach houses which has given us very good results. Our bleach houses are built out in the lot away from the mill building proper, somewhere in the neighborhood of twenty to forty feet. They consist of buildings about 8 ft. wide by 25 ft. long, 7 ft. high to the plate, and having a shanty roof with a quarter pitch. The sides are constructed of ordinary joist covered with sheeting and ordinary roofing paper of the two or three-ply type. All of the nails used in the building, whether they be wire nails or cut nails, are boiled in paraffin wax for half an hour. This fills up the pores in the metal, and keeps the sulphur from attacking it.

The insides and roof are covered with beaver board,

which is fitted in large sheets quite carefully with lugs at top and bottom, which just hold it into place and exposes the fewest possible screw nail heads (which also have been boiled in paraffin). The "V" ceiling top is covered in like manner. These sheets of beaver board are replaced about every three months when they become too rotten to be air tight. We have used this class of material to give us the least trouble and best service in tight bleach houses. We are entirely free from spots of any kind in winter or in damp weather. We trust the above information will be of some help to you.

THE GALT KNITTING CO., LTD.,
Galt, Ont., Canada.

Determining Degree of Chlorination

What is the best standard method for determining the degree of chlorination of worsted yarn? Any information you can give us on this matter will be greatly appreciated.
(5771)

We do not know of any standard method for determining the degree of chlorination of worsted yarn. There is a possibility that some mills or underwear plants that resort to the chlorination process for rendering their goods unshrinkable may have a control test for making this determination. Chlorine, of course, has a particularly vigorous chemical affinity for wool. It is stated by certain authorities that as much as 30% on the weight of the wool can be taken up. Long before this stage, however, the entire character of the wool molecule would be greatly altered and the fibers tendered to such an extent that they would fall apart in a pulp.

The only method that we know of that could be used for determining the amount of chlorine combined with the wool fiber during the process of chlorination, would be to make a quantitative analysis of the chlorinated wool fiber and thus ascertain the percentage of chlorine present. This is a long and tedious process and would require an experienced chemist. Such a method would in no way be practical for a routine control test.

Streaks in Georgette Crepe

I am enclosing sample of silk. You will please notice the streaks in same. Would like you to tell me what caused same. (5777)

The cause of the streaks which show up in the sample of georgette crepe is heavy and light ends. The inquirer can see this by placing a glass on the sample at the place marked with a black pencil.

Finish on Imported Chambray

I am sending a small sample of imported chambray and would appreciate your obtaining any information you can as to what would be the best methods to adopt to duplicate the finish on this piece of cloth; also the machinery required. (5763)

The goods should be sewed end to end for continuous operation and passed through two slack type, light construction, dolly washers. The first washer would contain hot or warm soap solution for obtaining a full or scoured condition, with the idea of eliminating reed marks from the warps. The second slack washer would be arranged to run in direct connection with the first as a tandem outfit, and would accomplish nothing more than washing or rinsing the goods after the soaping treatment.

At the end of the hot water rinsing machine or washing machine would be a light type squeezer, where the goods could be laid in trucks or storage bins. They should then be opened on a scutcher combined with a light 3-roll water mangle for removing excess moisture, and passed directly on to a 2-roll mangle running in connection with this range for softening or treating to give the smooth finished effect and laid down in trucks. From here they would be passed over a finishing range consisting of 4 to 6 drying cylinders followed by a compensator, 70 to 90 ft. straight-away tenter properly housed, with a high velocity hot air heating system for drying the goods as they pass over the tenter, and wound on rolls at the end of the tenter. They should then be taken to a 5-roll calender with three cotton rolls and two chilled iron rolls.

For producing the finish as shown, combination rolls are not desirable. British and Continental European manufacturers of chambray use cotton rolls almost exclusively.

If high production is required, the calender could be operated in direct connection with the tenter, but this is not particularly desirable where cotton rolls are in use, due to the fact that running goods direct from a tenter on to the calender brings the fabric in one position on the calender roll continuously, eventually making a hollow place. A finishing range of this type can be run at any speed, from 40 yds. per min. to 85 yds. per min., depending on the efficiency of the drying system in connection with the tenter.

Measuring Amount of Dyestuff in a Bath

Could you recommend any general method for measuring the amount of a dyestuff dissolved per unit in a dyebath when no other dyestuff is contained at the same time by the dyebath? What books can you recommend on this subject? (5774)

There are several methods for measuring the amount of dyestuff dissolved in a dyebath. The most widely used is that of making comparative dyeings against standards of known strength. In the case of substantive colors, for example, a stock solution of the dyestuff is made by dissolving 1 gram of the dyestuff in 1 liter of water. Varying amounts of this stock solution—say 25 cc., 50 cc., 75 cc., and 100 cc.—are measured into each of several beakers and the solution in each beaker diluted to 500 cc. with distilled water. The dyebaths are next brought to a boil, 10 grams of cotton—in loose form, skein, or piece—are introduced and dyed for 15 min., then rinsed and dried. In another beaker 500 cc. of the dyebath whose strength is to be determined is brought to a boil and 10 grams of cotton dyed in the same manner. A comparison of the depth of shade of the dyeing made in the bath of unknown strength with that produced from the standard solution will enable one to calculate the approximate strength of the dyebath under examination.

Certain variations in procedure have to be made in the case of other classes of dyestuffs, such as the acid, basic, chrome, and celanese colors. Any standard book on the subject of dyeing will give further details of this method. Matthew's book, "Application of Dyestuffs" is especially recommended.

A simple method of dye testing which is of value in some instances is the colorimetric method. A 1% solution of the dyestuff is made by dissolving 10 grams of the color in 1 liter of water. Varying quantities of this solution, such as 10 cc., 20 cc., 30 cc., and 40 cc., are placed in a series of Nessler tubes and diluted to 50 cc. with distilled water. In another Nessler tube is placed 50 cc. of the dyebath to be examined. The shade of the unknown bath is then matched to the solution of known strength which is nearest in depth of shade, and the strength of the dyebath in question calculated from this colorimetric determination.

A third method which more recently has been suggested for the estimation of the strength of dyes is by titration with titanous chloride.

Making Corkscrew Twists

I would like to make a yarn like the enclosed sample, and wish you would advise me how to proceed to get this product. (5767)

This yarn belongs to the class or style of ply yarns known as "spiral" yarns or "corkscrew" twists. Such yarns are made by combining light and heavy yarns in a ply strand. Whenever you twist together a light and a heavy yarn, the heavy yarn tends to throw itself around the finer one. But when you want to make an especially pronounced spiral effect it is necessary to prepare the individual strands quite carefully.

The yarn submitted with this question is made up in the manner shown in the diagram at Fig. 1. The numbers of yarn given are only approximate, as only a few feet of the yarn are available for weighing. In attempting to produce this particular yarn, it would be well to proceed as follows: First make some two-ply yarn about 18/2 with 13.6 turns per inch, left twist (spiral running up to the left). At the same time make a heavy single yarn, about No. 4, with 10 turns per inch, approximately, of right twist (spiral running up to right when yarn is held vertically). Then on another twister unite the 18/2 and the single No. 4 in a ply yarn with 19.3 turns of left twist. This sets up quite a large contraction, owing to the fact that 18/2 and this twist are both twisted in the same direction.

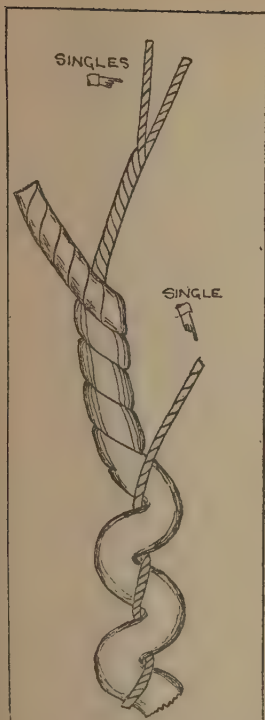


Fig. 1. Spiral Yarn

Finally, this heavily contracted 18/2 and single No. 4 combination are plied with another single yarn of about No. 20, and the twist this time amounts to about 8.8 turns to the right. As the single 20 used in the final ply is also spun to the right, its plying with the heavy strand in the same direction sets up a contraction in the single 20. On the other hand, the heavy strand, which is now being twisted in a direction opposite the last twisting, begins to elongate and so forms a very pronounced spiral about the finer yarn.

A noteworthy feature of the yarn submitted is that when you apply tension to it, all the fine yarns in it appear to break at the same time. This is true so far as can be learned from the very limited amount submitted for examination. The very heavy yarn in the strand really adds nothing to its strength, as it is practically an untwisted mass of fiber as it stands in the final yarn. To have all the fine strands sharing the tension equally is of great importance, because it makes the strand much stronger than it otherwise would be.

A yarn similar to this could be made for less expense by uniting in a ply yarn a fine and a coarse yarn (for example, a No. 10 or 12 and a No. 4), twisting them together in the same direction as they were twisted in spinning. This would set up a great contraction in the ply yarn. Now

unite this ply yarn with another fine single yarn (about No. 20) made with left twist instead of the usual right twist. At this twisting have the twist to the left, which slightly contracts the fine yarn but greatly elongates the heavy strand, enabling it to form a pronounced spiral on the finished strand.

Such a yarn as this may be made in two twisting operations instead of three, but it would probably be lacking somewhat in strength as compared with this sample. There is no need of using any fancy attachment on the twister for making such a yarn as this; the only thing necessary is to have the right direction of twist and the correct amount of twist.

Corroded Knitting Machine Parts

We are experiencing some trouble with the knock-over bits on our footers rusting or rather being acid eaten. This condition only shows up where the silk is running. The same condition shows up on our transfer bar points, where the silk part of the hose touches and where the bar is clamped together. We wet the hose at the point where attached to the transfer bar with a solution of 1 pt. of silk oil to 4 gals. of water as taken from city hydrant. Once weekly we wet the needles and transfer bar points with sewing machine oil, to which is added a small amount of tallow. We are enclosing samples for your inspection and would appreciate your advice as to what is causing this condition. (5750)

Examination under a microscope of the parts submitted shows a decided stain on the metal and in some instances small pitted places. The stain will not come off the metal, indicating that actual corrosion has taken place. A very competent man states that the trouble is due to the reaction of the silk oil on the metal parts.

An examination of the water and oils used gave the following results:

City Water—no trouble.

Oil and Tallow—very slight organic acid tendency.

Emulsion of Silk Oil—organic acid present in small quantity, probably oleic.

Silk Oil—acid with organic acid, as oleic acid. Test shows at least 1.6% acid.

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The silk oil is very apparently at fault with too much organic acid present. Oleic acid will attack iron and in the presence of water the action is intensified.

Doubtless the stockings have a fairly light fabric of silk with a fairly heavy cotton heel. As a result, the cotton absorbs the emulsion so that little is left to affect the transfer points and the knocking-over bits. The silk may not absorb all the emulsion and so some is left on the points and bits. This gradually accumulates and eats into the iron of the parts. Continual action of this sort will cause the knocking-over bits to be so corroded that they will cut the yarns and an entire new set will be needed.

If the silk oil is old it would be well to use new oil and possibly it would be well to get another oil without the acid present.

Metallic Effects

Can you give us any information regarding the methods of European mills in getting metallic effects in cloths?
(5976)

An English correspondent to whom the inquiry has been addressed writes as follows: Endeavor has been made of late years to satisfy the hankering after metallic effects by substituting artificial silk for metallic tinsel. This tendency has been particularly noticeable in furnishing fabrics made for cushion and chair covers, door and window hangings. The appearance of either gold or silver thread is successfully duplicated without the harshness, stiffness, scratchiness, and liability to tarnish which are almost inseparable from the use of metal. Instances of this use are to be found in cloth-of-gold weft satins with a worsted or cotton warp, and in jacquards figured in gold or silver colored artificial silk on a black, blue, or other sufficiently contrasted dull background. The goods have done well for some years and the artificial silk has been used also as a grandrelle twist to give a metallic speckle.

The metallic printing process used most largely upon cotton fabrics for linings, skirtings, and domestic overalls, is another of the means by which the necessity of weaving metal threads has been avoided. Even stenciling with a form of gold paint is not unknown and represents one

means of obtaining a crusted, crystalline effect as an alternative to embroidering.

High-class woven metallic figures have been more largely imported into England than manufactured, a large proportion coming of course from Lyons. The use of genuine gold and silver wire in the loom and in lace-making has been known for some hundreds of years, and a certain employment is found for tinsel plate irrespective of fashion. Tinsel plate wrapped around a cotton thread is used to weave fancy headings upon cloths exported to some of the eastern countries. Tinsel thread twisted in the same way around a yellow dyed cotton yarn is extensively employed in Indian embroideries. Low grade cotton warp woolen meltons shipped from England to India return in the form of heavily embroidered tinsel table-covers, with the gold thread handstitched to the surface of the fabric.

Light fabrics of loose texture used for Christmas decorations and fancy dresses for stage and ballroom use are woven from flat tinsel plate across an open cotton warp, but the article cannot be described as important. The fashion for tinsel effects in dress goods has been a recurrent one over a long time, cropping up at intervals after an example has been set in the silk trade. Flat tinsel plate imported from the Continent has been stocked in small quantities by yarn merchants and in varying breadths. It has been purchased by small firms specializing in the production of fancy twists and doubled with singles cotton on flyer twisting frames to form a more or less close spiral.

Use in Yarns

Another form in which tinsel has been used in England in the past is in more highly compounded fancy yarns. Worsted rovings of two or more colors have been doubled with a cotton binding thread, and one end of flat tinsel plate in fancy slub, spiral and loop yarns. Irregularities of effect have been produced by the simple expedient of knocking out cogs from the wheels of the twisting frame, giving in this way bunched knots of flat gold tinsel at intervals. The output of yarns of this style has never been large but the freedom of effect obtainable by judicious use of color in the wool components, aided by the glitter of the metal, has been welcome in some seasons to manufacturers of fancy dress cloths.

Metallic thread suffers in any event from certain disadvantages, and other substitutes than artificial silk have been sought. One of these is twisted paper, gilded upon one side, which was used years ago in goods understood to be French. There is a gain of pliability in using a cotton thread twisted with a paper instead of a metal ribbon, although whether the article is readily obtainable at present may be doubted. Manufacturers of yarn might be tempted to experiment in this direction, although the all-paper thread is necessarily a somewhat heavy one.

Experiment has been made also in the direction of encrusting a layer of metal upon a core of cotton yarn, and the normal result has been a harsh and wiry yarn of doubtful utility or economy. The writer is under the impression that this problem engaged the attention some years ago of one of the great German dye making companies. The intermittency of demand and the alternative presented by artificial silks, particularly of those which can be cross-dyed, presumably affect the practicability of any such solution.

The foregoing reviews the question from the standpoint of one individual's experience. The means of insuring against any loss of the subtler draping qualities of wool goods woven with an intermixture of tinsel is a separate affair. The writer has seen none in which the pliability was not affected in some degree. It appears that the gauge of the metal as well as the nature of the alloy must affect the equation. If twisted around a cotton core it is manifest that the close wrapping requisite to produce a solid metal effect is likely to lend greater stiffness than a more open spiral showing a mere speckle of metallic glitter. When special lissomness is wanted in the warp of wool dress goods short-spun silk yarn can be substituted, of course at appreciably higher expense. Only experiment could determine whether the small gain arising from the use of silk in place of cotton would not be entirely counteracted by the resistance to bending presented by the ribbon of metal.

If softness of draping is a primary essential then artificial silk in one or other of its forms offers the most hopeful escape. The silk need not be in the form of a round thread. Flat viscose silk like that used for hat braiding has been successfully used in Lancashire fancy cottons upon a back-

ground of cotton crepe or sponge cloth. No doubt both the set and the beat-up of the loom will require special attention. A larger allowance for the effects of finishing will be necessary in woolen fancies than in cottons, but when dyed in a suitable color, the material presents an appearance not widely different from untwisted tinsel plate

Finishing Weighted Canton Crepe

Kindly advise us how the satin-like luster is obtained on the enclosed sample of weighted Canton crepe. What finishing machines are used? (5732)

The Van Vlaanderen Machine Co., Paterson, N. J., reply to this question as follows: We have examined the sample of weighted Canton crepe and conclude that in the finishing process it was first treated with a softener made especially for weighted goods. This was probably done on a 3-roll quetsch. The goods were then tentered on a tentering frame and run through a 3-roll calender; that is, a calender with two paper rolls and one steel roll.

Soap for Fulling and Scouring

Would like some comments on the following soap formula to be used on virgin wool and noil piece dye fabrics, both for fulling and scouring:

1600 gals.	{	210 lbs. palm oil
		210 lbs. red oil
		55 lbs. caustic potash
		600 lbs. 58 alkali

How is the percentage of alkali? What would be the best method for mixing the ingredients? (5684)

A total quantity of 420 lbs. of oil is used against 55 lbs. of caustic potash, which is a ratio of approximately 1 to 8. This will serve to saponify the oils in itself, provided perfect combination is secured. The additional 600 lbs. of 58 deg. alkali would complete the process and make a tremendous excess of alkali. For certain types of greasy wool the resultant soap, if properly made, might work; and the same might be said for fulling.

It seems to violate, however, most of the accepted theories of both fulling and scouring in that there is a combination

of heavy palm oil with a red oil. We assume the titre of the palm oil is in the vicinity of 44 deg., and the red oil used is in the vicinity of 20 deg. This would end up with the soap carrying a medium body, which would be too heavy for scouring and not heavy enough for fulling. The solution would contain between 3 and 4 ozs. of soap and an equal quantity of alkali per gallon. While this would make a jelly when cooled, it would be difficult to forecast the results when used as a fulling agent. As a scouring agent, it of course would require further dilution.

The inquirer is apparently dabbling around in the soap industry and unless he is equipped to make soap it would seem that he is headed for trouble. Soap manufacturers have produced meritorious products based on their experience in soap manufacture and the use of their products in the textile industry.

Rayon Tendered in Dyeing

Am enclosing piece of hosiery made from 1/40 wool and 100 denier artificial silk. We would like to have your opinion as to the cause of the artificial silk acting as it does. As you can see by the sample, the artificial silk shakes out after dyeing. (5685)

Your trouble may come from using excessive amounts of mineral acid, such as sulphuric, in your dyeing process, or from not washing the acid out completely after dyeing, but allowing it to dry on the silk. The latter would be more apt to cause the excessive tendering of the rayon, as shown in the sample submitted.

If you use colors that dye with acetic or formic acid and make sure that the goods are free of acid before drying, your trouble will undoubtedly disappear.

Sized Yarn Sticks to Slasher Cylinder

I would like to ask your assistance on a problem in slashing. I am having trouble with the yarn sticking to the cylinders. I am using 120 lbs. of starch, 25 lbs. sizing compound, 5 lbs. tallow, to 200 gals. water, and boil 1½ hrs. Have tried a great many variations on the above mixture but get no better results. Hope you can suggest something to help me out. I might also add for your information that the goods woven are a 80 by 90, 30s-40s shirting, which we

have been making for a long time, and it is only within the last few months that we are having any trouble. Any information you can give me will be greatly appreciated.

(5676)

Your trouble comes from a lack of sufficient softening material in your sizing formula. The proportion of starch and sizing compound to the amount of water is all right. But the 5 lbs. of tallow is not enough to give the yarn the smoothness that it should have to help it through the harnesses and reed at the loom. We think you should have at least 7 lbs. of tallow to a mixing. However, we would suggest that you go at this cautiously. Add half a pound at a time until you reach the amount which will correct your trouble. It would be well to look over your rolls to see if they need recovering. If the yarn leaves the size very wet, or has a very glazy appearance, put on a new blanket as soon as possible. Also take note of the steam pressure; it may be running too high and baking the yarn to the cylinders.

Silk Filling Breaks in Cotton Mixed Fabric

Attached are a few cuts of cloth in the gray which has single 20/22 Canton in it. One of our customers who is using this 20/22 single Canton states that they are finding a few isolated cases in their weaving where the silk seems to be absolutely separated in the cloth, as you will see in this fabric. They find this to be so singular that they wanted to know what might cause it. We have written them that we are of the opinion that it is due to the tension in their weaving. Will you kindly let us have your full report thereon, as soon as you have examined this cloth, so that we can advise them in turn.

(5682)

The fabric submitted is made with 76 ends per inch of fairly fine single cotton yarns, with right and left twists, being warped two ends right and two ends left, alternately. The twist is hard, and the cloth is evidently designed for a warp crepe fabric. In the filling there are about 76 picks per inch of Canton silk filling, woven single, and presumably of the size described in the inquiry, that is 20/22 denier.

An examination of this cloth makes clear the cause of the trouble. Instead of its being singular that the cloth should "break," it would be singular if it did not break. The number of picks for this size of silk yarn represents

an extremely slim amount of filling, even if the yarn was in the highest degree regular in size. But Canton silks can by no means be relied on for regularity of size.

A few breaking tests for strength which I made showed divergencies such as 13 lbs., 9 lbs., 7 lbs., and 5 lbs. per inch; and along the path of the breakages, no pounds at all; that is, the filling at those places did not have sufficient strength even to move the finger of the indicator, and simply broke apart. An inspection of these parts against the light under the magnifying glass shows that the thread in these places is most attenuated, and it would be absolutely impossible with so few picks to the inch, and with filling of the extreme fineness which is exhibited at these places, that the cloth could have any strength. The condition of the structure of the cloth at these places is such that a very slight pull filling-ways will sunder a large number of the picks. If temples were used in the weaving of the cloth, the lateral stretch given by them would be quite sufficient to cause breaks. But whether these develop in the loom or subsequently, it requires but a very slight local pull to burst the material.

Of course, any manufacturer who elects to make a cloth of this construction, using for filling so few picks of a material that will certainly contain many fine places in the thread, is taking big chances. If the goods are boiled-off, it is fair to infer that the places will then be even weaker than they are now, and, if, in the finishing, breaks develop in the fabric, there is no ground for blaming the finisher.

To sum it up, I would say that the goods as manufactured, with the particular yarn used, ought in places to break, and if they don't it will only be due to a kindly interposition of Providence.

Uneven Filling in Satin Crepe

We are sending a sample of boiled-off satin crepe. We would like to have your opinion on what causes the abrupt changes from the smooth cloth to the crinkled in the places we have marked with a blue pencil. (5866)

These changes are caused by the unevenness of the filling in the satin crepe, and are more noticeable on the sample because it has not been finished. This is nothing to worry about as the changes will be barely perceptible after the goods are finished.

Harnesses in Weaving Gros Grain Silk Ribbon

We enclose a sample of silk gros grain ribbon. We would like to have you inform us as to the best method of arrangement in the harnesses. We wish to know the number of harness frames used in the body of the fabric and in the edge, and whether each edge is drawn on a separate set of frames. There are several arrangements possible and we would like to know which is considered the most satisfactory for weaving silk. Any information you can give us will be appreciated.

(5854)

Theoretically, this web would need but four harnesses; however, six harnesses prove better and eight harnesses are the most satisfactory. The two edges are run on separate sets of harnesses. The arrangement when using eight harnesses is as follows: The ends in the left edge are drawn in alternately on harnesses Nos. 1 and 2; No. 1 harness working 2 up, 2 down, and No. 2 harness working 2 down, 2 up. The ends in the body of the web are drawn in in progressive order on harnesses Nos. 5, 6, 7 and 8. Harnesses Nos. 5 and 7 work 1 down, 2 up, 1 down; while harnesses Nos. 6 and 8 work 1 up, 2 down, 1 up. Of course it is possible to draw the body on 2 harnesses, but such an arrangement is likely to crowd the heddles and present the danger of chafing the yarn which is particularly disastrous in the case of silk.

Of the first two ends in the right edge, i.e., the two ends next to the body of the web, the first is drawn in on No. 1 harness, and the second on No. 2 harness. The reason for this is to make a break in the weave between the body of the web and the edge, so that both edges will appear the same. The remaining ends of the right edge are drawn in alternately on harnesses Nos. 3 and 4. No. 3 harness works 1 down, 2 up, 1 down; and No. 4 harness works 1 up, 2 down, 1 up. The reason for drawing the edges on the front harnesses is that in almost all narrow fabrics the edges are very important, and the front harnesses being nearer the shuttle, require a smaller shed than the back harnesses. The smaller shed places less strain upon the yarn and insures a better edge.

Using Back-Wound Silk

We have difficulty in using up back-wound silk. When we attempt to wind some on a cone, putting other silk on top, the kinky nature of the back-wound silk makes a soft foundation that causes trouble with the winding. Whereas, when we put it on top of other silk, it seems to run hard and glossy, and the threads thus forced together stick, causing trouble on the knitting machines. Is there any special solution it can be run through to eliminate this or is some other treatment advisable? We have but little to do, so it is advisable to put this silk on cones with the other silk. Our silk is gum silk, 5-thread. (5858)

To succeed in using up back-wound silk it is necessary to keep it separate from the regular stock. Every time gum silk is wound it stretches the thread and changes its ductility, and under atmospheric changes the contraction on the cone is different on the back-wound silk than on the regular stock. Our suggestions are that you handle the work as follows:

First, unwind the thread from the stocking on to a bobbin. Second, run the thread from the bobbin over a dampening roll on the cone winder, under a good tension to draw out the kinks. Regulate the tension and wetness until the desired results are obtained. Do not make the cone any larger than a day's run, as the silk left over may become hard over night.

Standards for Hardness of Twines

I would appreciate any information that you might give me concerning any proposed or adopted standards for expressing in absolute terms the degrees of hardness in seine twines. Do you think that a standard could be based logically on the contraction of the single yarn in the cabled goods? I would like to know also the percentage of contraction generally accepted for the various degrees of hardness. (5655)

So far as the writer knows there is no proposed or accepted method used for expressing the hardness of seine twines. The policy of expressing the hardness of a twine in terms based upon the contraction of the single yarns seems to me to be open to the objection that an analysis of the twine would be necessary in order to establish the

degree of hardness. A method which would utilize the amounts of twist in both the single and ply yarns would be open to the same objection; namely, the necessity for analysis. It might be possible to utilize the angle of the spirals of twist in the finished twine, but this would ignore the earlier twists in singles and component cords, and also be difficult to measure in fine strands.

The following method is suggested as one giving an expression of hardness or density, rather than an expression of twists: By the use of an instrument similar to a device now used as a thickness gauge, determine the extent to which a cord may be flattened by imposing upon it a known weight for a fixed length of time, thus registering the extent to which the cord is flattened under the conditions given. The harder and more dense the cord, the less would the flattening be.

The objection to this method is that under the same weight heavy cords would flatten less than small ones of the same relative construction. Perhaps it would be possible to graduate the weight according to the weight or size of the strand being tested.

Finishing Elastic Web Made with Rayon Filling

We wish to inquire if you can give us any information that will help us to improve the finishing of elastic webbing made with artificial silk filling. Our trouble is that after the elastic is run through the size and over the calender rolls the luster is knocked down and diminished tremendously. We are enclosing samples herewith to give you an idea of this. We use the regular web finishing machines with steam heated calender rolls; the web is run through a sizing and then passes through squeeze rolls, then over the calender rolls. Any information you can give us will be greatly appreciated.

(5641)

The outstanding feature in the finishing of artificial silk elastic webs is the retention of the luster of the rayon. All other factors must largely be subordinate. In ordinary cotton elastic web fabrics, and even where a small percentage of silk is used in warp effects, very little regard is paid to this feature so long as the goods have the desired firmness and proper "hand," without being unduly harsh, and the contraction of the web is satisfactorily regulated.

In such webs, sizing materials of various kinds, both gums and starches, may be used in order to produce the desired character of finish. Very little regard is paid to the luster so long as a good finish in all other respects is the result. But with artificial silk goods, and particularly where silk is used for filling, which covers the entire face of the goods, it is very different. The high luster of the goods must not be materially interfered with in the finishing process, otherwise a marked depreciation in value takes place and the selling quality of the product is at once impaired.

By a careful analysis of a product finished with any kind of material, it will be noticed that the goods will be coated with a fine covering of the material used in the process, which may interfere more or less with the luster of the goods, according to the density of this covering and the character of the sizing used. It will, therefore, be seen that much depends on the quality of the sizing, as well as the method of application.

In order to maintain a full luster on artificial silk goods, the sizing must be perfectly clear and transparent, so that nothing will obscure the luster on the goods finished. The best sizing for goods of this character is the purest flake gelatine obtainable, which is generally an imported product, such as is largely used in the confectionary trade. This gelatine, being perfectly transparent, and when properly applied, will allow for the full original luster of the silk without producing any of the deadening effect such as is in evidence when cheaper materials are used.

Of course even this condition can be spoiled by careless application. If the drying cans are overheated, a fine coating of sizing may be baked on, so that a discoloration will take place, and the luster become flattened. If the goods are to be immersed, experience will quickly determine the proper consistency of the liquor employed. After being immersed, the goods should not pass directly on to the bare drying cans; the first can should be covered with a cloth to absorb any surplus moisture and permit the goods to dry gradually without any danger of baking. For the best results, slow drying with the cans not overheated is preferable to fast travel over highly heated cans.

On artificial silk honeycomb webs, like the sample submitted, some manufacturers find it better not to immerse the goods in the size bath but to use a more concentrated

mixture and allow the lower nip roll to run in this liquor; then pass the goods through the nip rolls so that the web will absorb the sizing taken up by the immersed roll. By this method, however, it may become necessary to travel the webs through a covered steam chest in order to prepare them to take up the sizing and also to obtain the desired contraction of the goods. The main conditions are correct material and slow drying, avoiding all risk of baking and discoloration. Experience will soon dictate other minor but desirable details in connection with these.

Acids in Treatment of Wool

It is necessary for us at this time to have accurate information on the following questions, and we trust you will accord us the same good service you have rendered on former occasions: (1) How many acids are used in conjunction with the treatment of wool in such processes as scouring, carbonizing and dyeing? (2) How many of these acids would destroy the serrations of the fiber and penetrate its core; and how quickly would this occur? (5637)

(1) Under scouring, no acids of any kind are used in common practice. The writer has seen a scouring compound containing small quantities of carbolic acid in emulsion with other ingredients. Under carbonizing, the principal acid is sulphuric or oil of vitriol. A very large use is made of this material for carbonizing purposes. While the effect of aluminum chloride is primarily due to the liberation of hydrochloric acid by the influence of high temperature, so far as the writer knows hydrochloric acid is not used by itself as a carbonizing agent. The same may be said of magnesium chloride and sodium acid sulphate, the use of which seems to be confined to English text books.

In the dyeing operation, a variety of acids are used, such as acetic, formic, tartaric and sulphuric. By far the largest use is made of two, namely, sulphuric and acetic; although the tartaric acid is also used in large quantities in preparing wool with chrome for the application of chrome dyestuffs. Sulphuric acid and acetic acid are the ordinary acids used in dyeing with acid dyes. Sulphurous acid is used in bleaching wool. It ordinarily is produced by the action of burning sulphur or from sodium sulphate and acid.

(2) All of the above acids, given sufficient concentration

and time, would completely destroy wool fiber. Naturally the strongest acids would have the greatest destructive power. Used in dilute form, however, there is no serious destruction of serrations of the fiber. Indeed sulphuric acid in dilute form is used as a fulling agent. Eliminating sulphuric acid, it is highly improbable that serious damage would occur to the wool fiber from the other acids under any conditions which might occur in normal mill practice.

Relative to the speed of penetration, no fixed time can be given, as this naturally is a function of the concentration of the acid, temperature, and kind of wool. A cattle hair, which can be classed as a wool fiber, would not be penetrated as quickly as a fine wool with many fine scales and serrations.

Single and Double Damasks

We have been trying to learn the minimum and maximum thread count in single damask table linen, as well as in double damask table linen. If you can give us this information it will be greatly appreciated. (5853)

Single damasks are made with as low as 55 threads of warp and 60 threads of filling per inch. The finer fabrics increase in multiples of 5 threads per inch to about 80 threads of warp and 85 threads of filling per inch.

Double damasks commence with about 80 threads of warp and 120 threads of filling per inch. The finer fabrics increase in multiples of 5 threads per inch to approximately 110 warp and 170 filling threads per inch. For very special purposes finer textures are woven as detailed in the following notes:

Modern linen damasks are usually classified as single or double. A single damask is produced with approximately the same number of warp and filling threads per inch—appropriately described in the technical term “woven on the square.” A double damask usually contains approximately two warp threads to every three filling threads in the finished cloth, with a minimum of 176 threads per square inch. For example, a linen damask having 100 threads of warp and 150 threads of filling per inch is an average type of double damask.

The finest modern commercial linen damask contains 126 threads of warp and 188 threads of filling per inch, equal

to 314 threads per square inch of cloth. The completed and finished cloth measures $2\frac{1}{2}$ yds. by 6 yds., and weighs $78\frac{3}{4}$ oz. or $5\frac{1}{4}$ oz. per square yard.

Linen napkins and "table tops" to match the full size damask covers are usually produced slightly finer in texture and relatively lighter in weight. A napkin of normal size is $\frac{3}{4}$ yd. square, and a "table top" 1 yd. square. The finest modern setting for a commercial napkin is 142 ends and 213 picks per inch of cloth. Both of these cloths are made single and double.

The origin and meaning of the term "double damask" have been the subject of long and varied controversy. The designation "double damask" is not only ambiguous, but it is misleading, since the fabric structure is in every technical sense a single cloth. The name is a relic of the handloom damask weaver, and is obviously empirical. Most probably it is derived from the technical difference in treading the binding sheds for two sateen weaves.

Formerly, damasks were all woven in common harness—i.e., the single-lift jacquard machine, or its predecessor the draw-loom combined with a set of pressure heddles mounted and free to operate in front of the harness. The function of the pressure heddles was and still is to produce the satin binding weave in the ground and figure of the design and cloth. A five-harness satin was generally used for the binding structure in a single damask, which was relatively light in weight. An eight-harness satin twill was employed for the binding structure of a double damask, because it was required to be relatively heavier, finer, and of better quality, and because the eight-harness satin weave facilitated the attainment of these objects.

The technical characteristic of a five-harness satin twill is that in draft the pattern "skips" one harness for each successive thread, whereas for an eight-harness satin twill, the pattern skips two harnesses for each successive thread. Since, as stated above, the former weave was always used for the lighter and the latter for the heavier damask, the difference in skipping either one or two treadles in the production of the pattern was probably the deciding factor in influencing the weaver to make a distinction between the two damasks by designating them "single" and "double" respectively.

Yarn Yield from Wool Mix

Will you please give us some information on the following subjects: In mixes put down of 2,000 lbs. of 2/20s cut stock, the mix consists of 45% wool, 30% noils, and 25% of good waste. How much actual twisted yarn should be produced from these 2,000 lbs? Another batch of 2,000 lbs. is placed for 2/10s yarns. It consists of 30% wool, 20% noils, and 50% waste. How much actual yarn should be produced from such a batch? (5871)

The agent of a mill who has run similar lots states that the mix containing 45% wool, 30% noils, and 25% good waste, should give in his estimation about 92% yield, or about 1840 lbs. of twisted yarn, under favorable conditions. He states that the other mix consisting of 30% wool, 20% noils, and 50% good waste, should give about 90% yield, or 1785 lbs. of yarn.

A carder of long experience states that the first lot should give a yield of between 90 and 95%, and the second lot should yield 85 to 90%.

Metal Coating for Tanks

We have a 3,000 gallon hot water tank made of steel and heated by means of copper steam coils. The tank is set right on the water line and the water pressure is about 50 pounds. This tank has the defect of giving water of a yellowish appearance, due probably to rust. We have been using for about six months a compound made principally of silicate of soda but, although this method has given a slight improvement, it has not been really successful. We have heard of metal spraying processes. Could they be used in order to give to the tank an inside lining of copper and, if they can, what concerns do that kind of spraying? (5872)

A metal coating can be sprayed on the tank by the Schoop process, as put out by the Metals Coating Company of America, 495 North Third St., Philadelphia, Pa. In reply to the question on coating metal tanks they state that such work is being performed daily at costs which come well within commercial limits. For providing protection against corrosion electro-positive metals should be used, and zinc and aluminum are largely used for this purpose. If acid conditions prevail, lead gives excellent results, and in many

cases, combination coatings are used. So it will be understood that the exact conditions that exist should be known so that a proper metal may be selected for the service, or a combination of metals. Any of the commercial metals may be readily applied.

Napper Details for a Cotton Fabric

We are interested in finishing cotton sheeting woven with soft spun filling for napped finish. We have experimented in our finishing plant but to date have been unsuccessful in securing a close duvetyn or felt effect. Our main trouble seems to be that our finish is shaggy and hairy, and does not felt in properly to give the closely felted feel and duvetyn appearance. We know that our gray goods are right as our competitors finish them successfully. We think that our trouble is in the napping and felting, although our machines of this type are modern.

Would you be kind enough to advise what kind of napper clothing—that is, number of wire and the type of bend and point—and how many runs on the napper and felter would be required? Also would this work be done dry after the goods are bleached? We are enclosing sample of gray goods, our competitor's finished goods, and our own finish, and would thank you to advise us where we are in error.

(5846)

The Davis & Furber Machine Co., No. Andover, Mass., reply to this inquiry as follows: The fabric labeled "competitor's cloth" is what is known as victory cloth, also casket cloth. This cloth has had a most generous demand owing to its felted finish. It is napped and felted before it is dyed in the jigs, and does not go to the napper a second time. It is dried on drying cans, giving it the closely felted effect which has made this cloth famous as regards finish. Comber waste is often used in its manufacture. The gray sample inclosed seems to be very well constructed for napping.

As regards the proper napping wire for this grade of napping, a machine should be covered with a 45 deg., 30/34 angular sized wire, 4/3 construction, and having a needle point grind. The felting wire is 45 deg., 30/34 angular sized wire, 6/3 construction and with needle point grind.

The number of runs in securing such a finish is hard to determine without closer contact with the problem, so much

depending on proper wire and proper adjustment of the machine; but we should say that eight runs ought to be ample at the most. The felting does not require more than two runs and the cloth should be run tight on this machine. A 36-roll double action napper is the proper machine for this work.

Streaks in Dyed Mercerized Hosiery

We are enclosing herewith two pairs of ladies' mercerized hose which we would like to submit to your Question and Answer Department. These stockings are knit from our 50/2 mercerized yarn. This particular customer is the only one that is complaining. We have called at this customer's plant and he selected these two pairs of stockings as being the worst that he could find, his complaint being streaks in the dyeing.

In looking over these stockings ourselves it struck us as being most peculiar that there were streaks at practically the same place in every stocking which is from ten to twelve inches from the top. It looks as if the stocking was knit more closely from there on down. We further note that in a good many of his stockings there is a streak in the dyeing just at the ankle where the stocking begins to close in. We will appreciate it if you will examine these stockings and tell us what you think is the trouble with these streaks in the dyeing. (5780)

The mysteries of the variations of knitted fabrics accentuated by the light reflecting qualities of lustrous yarns makes this a much deeper problem than the first reading of the question indicates.

The first sample was a portion of a full hose leg being of a taupe color, the upper part being decidedly lighter color in appearance than the lower part. On close examination, there was no texture difference; that is, the wales and courses seemed to be the same on either side of the dividing line. Yarns were ravelled from each part, giving the following:

	Yards	Grains	Size
Dark	64.5	22.6	23.75 or 47.5/2
Light	120	39	24.65 or 51.3/2

Then the ply twists per ten inches were counted in five lengths of each of these yarns giving:

TEXTILE WORLD

PLY TWISTS PER INCH

Dark	180	174	168	153	154=16.58 T.P.I.
Light	148	135	144	143	152=14.44 T.P.I.

An examination of the ravelled skeins themselves, compared in various lights and at different angles showed no difference in the color of the yarns themselves.

The second sample was a pair of gray full hose, one of which showed several banded effects. The upper part of the leg was noticeably lighter than the main part of the leg. The main part of the leg itself showed inconspicuous bands of different shades, while the foot showed a band of darker material occupying nearly one-half its length. The other stocking of the pair did not show such conspicuous bands, except that where the ankle and instep joined there seemed to be a color change.

The upper leg of the first stocking seemed looser than the main part of the leg; the wales per inch in each case were 21 but the courses were as follows:

Upper Leg	Lower Leg
22	29
22	31
22	30
—	—
22	30

The texture in the foot of this stocking was uniform throughout so the yarns were ravelled, giving the following results:

	Yards	Grains	Size
Dark	58.5	19.8	24.6 or 49.2/2
Light	54	17.2	26.2 or 52.4/2

Then the ply twists in five ten-inch lengths were counted, giving the following:

PLY TWISTS PER INCH

Dark	131	138	145	149	140=14.06 T.P.I.
Light	142	150	134	125	131=13.64 T.P.I.

The ravelled skeins of yarn showed no difference in color. An examination of the ankle and the instep of the second stocking showed the wales per inch practically the same, but the courses of the ankle were 29 when the courses of the instep were 34.

The third sample was a pair of brown full hose, with inconspicuous markings widely distributed. On both these stockings the instep was of closer construction than the ankle. The ankle averaged about 25 courses per inch, while the instep averaged about 35 courses per inch. A close examination of the smaller light streaks showed that the streak was usually composed of loops longer than those of the surrounding fabric.

Several conclusions have been drawn:

(1) Some of the color differences are doubtless due to differing texture which is an undesirable feature in the stockings.

(2) The variations in yarn size may be responsible for some variation as they would alter the "fullness" of the fabric where the texture is the same, and so the apparent color.

(Note that the coarser yarn produces the darker fabric.)

(3) A difference in twist is recognized as causing a difference in apparent color.

(Note that the harder twist produces the darker fabric and in these cases comes in conjunction with the coarser yarn.)

(4) The variations in the length of loops over short distances makes a varying texture for a small area.

In all this there is nothing pointing definitely to the mercerizing as being at fault. The knitting does not seem of the best; the yarns may be uneven in size and in twist. After eliminating these things, if the trouble still persists, perhaps the mercerizing may be blamed.

Knitting Worsted Yarns

We have started using worsted yarns for making knitted fabrics. We are using both Bradford and French spun yarns, and as yet have not had very successful results with either. We presume that we may not be handling these yarns properly in our winding and knitting departments. If you can give us any information which will help us out as to the best method of handling these yarns in the winding and knitting, we shall very greatly appreciate it. (5747)

Worsted yarn should not give trouble on machines that have been running woolen yarn if the diameter is about the same. The worsted yarn should be wound on cones or

bottle bobbins to give a uniform tension in knitting. The yarns are conditioned just before knitting in some mills, and in some mills are oiled. However, they might run without either oiling or conditioning. If you are using disk pressers, shoe pressers may be of help. We can be of more definite assistance if you will send some of the fabric and yarns and an accurate statement of just what you do and how the machines are equipped.

Sag in Brussels and Tapestry Carpets

When both our Brussels and tapestry carpets (cut and uncut) reach the burling department, streaks are found from $1\frac{1}{2}$ to 3 in. wide, running from $\frac{1}{4}$ to $\frac{1}{2}$ yd. long, that seem to blister or sag just as if the stuffer warp had loosened. These will run this way for 8 or 10 yds., then they will tighten and be satisfactory. They insist that it is caused by loose stuffer. Now the stuffer is made of 15 lb. jute, 3 ends to reed. The starch dressing is made of sago starch, 1 bag; gum, 1 bag; and bees wax, 10 lbs.

In starting the warp on the beam barrel, we merely tie the ends in bunches and hook them on the barrel. This will cause some ends to be slack, caused by bunches on the beam barrel. Do you know of any way to make a good leader to start the warp on the beam barrel? Could this blister or sag in the carpet be caused by the loom or by running the carpet through the dryer? (5856)

It would seem very likely that the trouble in the carpet is caused by the somewhat crude method of beaming. Knotting the warp ends on the beam barrel would certainly have a tendency to produce slack ends in the warps. Comparing the location of the defective places in the carpets with the locations where the warp ends are knotted onto the barrels should show up conclusively whether this is the trouble. A simple way of improving the method of beaming, which would overcome the trouble under consideration, is as follows:

Have a groove about $\frac{1}{4}$ in. deep and 1 in. wide made in the beam barrels. This groove should be fitted with a metal bar drilled for screws so as to countersink the heads, the screws being placed about 1 ft. apart. In starting up the warps, the ends could then be brought over the groove, the bar placed on top and screwed into place. In this way, all of the warp ends would have a fair chance of being of equal length and put on at uniform tension.

Tension on Warps During Weaving

For some time a great number of pieces woven satisfactorily have shown a barry effect which is caused by the tension ropes on beam heads not releasing properly, so that, as the warp takes up, the ropes will grip and release in jerks, which causes this effect. We have been trying everything but cannot seem to stop it. We have been advised in the past to use chains, which were tried out, but they did not help. Can you advise just what appliances on the beam head can be used to overcome this condition? In some plants they make a practice of washing the ropes every time the warp comes out, and place a clean pair on for a new warp. The ropes are treated with graphite.

(5836)

Chains are largely used and give satisfactory results. Sometimes the use of a smoother rope than customary will serve to eliminate the difficulty. Talc or powdered soapstone is frequently applied to the ropes. Graphite is also often used, but objection is often raised to the dirt created. We have lately been informed (by Carl A. Luft, 619 Alder St., Scranton, Pa.) of a simple device which it is claimed works very satisfactorily for this purpose. It consists of a small metallic casting resembling a collar button. Several of these castings are slipped between the strands of rope at intervals in the length of the rope encircling the tension pulley. This keeps the rope separate and allows soapstone or graphite to be sprinkled on and easily worked between the ropes, and also prevents the coils binding too firmly.

Manufacture of Felt Polishing Wheels

We have been making some investigation of the methods employed in the manufacture of felt polishing wheels in round. It is our understanding that European manufacturers are making all their wheels in this form. In the United States the custom seems to be, first, to make the felt in shapes, then saw it into squares, and then either use the square, holding it on to the polishing head by means of shrink rings over the corners, or taking a larger size square and sawing the corners off to make the wheel of the diameter required. From a comparison of prices, it would seem that this latter practice, involving as it does a waste of material of approximately 22%, and the use of some additional labor, brings the completed wheel out at a price mate-

rially greater than would be the case if they were manufactured in the round at the beginning.

Can you tell us of the processes used in Europe for accomplishing the above result? If they can make large wheels, say up to 41 in. in diameter in the round, American manufacturers should be able to do so also. If it is mainly a question of machinery then we evidently are not so well equipped as they are, say in Belgium where wheels are being made largely of goat hair and in sizes approximately the foregoing figure.

We should appreciate very much any information which might enable us to take up with American manufacturers this subject in a way that would perhaps lead them to give further consideration to making the discs in either pusher mills or other apparatus, and discontinue the method of sawing from square sheets. If there are any points which we may have overlooked which might have a bearing on our competition with the European polishing felt wheel industry that occur to you, we should be very glad to have you tell us. (5857)

Felt polishing wheels are of two types: those used on the periphery and those used on the face. The former are used by jewelers, metal workers, shoe manufacturers, and others who employ buffing machines in their process of manufacturing. These wheels run from about 1 in. in diameter to 16 or 18 in., and from 1/8 to 2 in. in thickness. They are cut out of wool felt sheets, the residue from the large wheels being used up by cutting into small wheels, so that there is not a large percentage of scrap.

The polishing wheels used on the face or flat are made from cow and goat hair and are used mostly for glass polishing. The hair is carded in the usual way and laid up into a bat on a Blamire lapper. These bats have a preliminary hardening on a regular flat bed hardener, are then cut up into squares, and finished on a special square hardener. Then they are usually soaked in acid and fullled in a large size pusher fulling mill, washed, extracted, dried, pressed, and trimmed. The thickness varies from 1/2 to 1 1/2 in. They are cut into squares with an apparent loss of material, as the inquirer suggests.

In order to manufacture these wheels round it would be necessary to card and harden as usual. They could then be cut into discs, proper allowance being made for shrinkage, and fullled by some special form of fulling mill. The regular pusher mill would not do it as it would distort

them. The subsequent processes would be the same as discussed before.

The trimmings after hardening could be reworked; this material would be the only saving, as the labor in processing round discs would be fully as much if not more than that of squares.

Special machines for fulling in the round form have been made by some felt manufacturers, but it is doubtful if the saving in material is sufficient to compensate for the slowing up in fulling and subsequent operations.

Red Spots on Chiffon Stockings

Enclosed find a pair of chiffon stockings which have become red spotted. One of our customers returned these stockings and complained of the spots, holding our dyeing responsible. Will it be possible for you to test these, and show what caused the spots? (5859)

The spots or streaks in these stockings are not due to the dyeing but rather are due to carelessness on the part of the customer. Obviously the hosiery, while wet, has been allowed to come in contact with something colored. This might happen in numerous ways, as on a discolored clothes line, or in the laundry. It would be impossible for hosiery such as this to get by the inspectors in the mill.

Finding Change in Price Paid Per Cut

Do you know what method is in general use for finding the change in price per cut? For example, we are running 68 by 72 on 39 in. goods, $4\frac{3}{4}$ yds. per pound, and we are changing and will run 80 by 80, 39 in. The warp yarns and filling yarns are the same in both cases. We are now paying $21\frac{3}{4}c$ per cut on style 68 by 72. (5736)

There are several methods of finding the change in the price per cut on different fabrics. In some mills the weave price is scaled up or down in direct proportion to the picks per inch. If this method were used in determining the weave price for 80 by 80 woven on the same loom, at the same speed and efficiency, and of the same counts of yarn as 68 by 72 for which $21\frac{3}{4}c$ per cut is paid, the procedure would be as follows:

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\$.2175x80

$$\frac{\quad}{72} = \$.2417, \text{ price per cut on } 80 \text{ by } 80$$

The above method works perfectly when the goods are woven on the same loom, at the same speed, efficiency, etc., but is not applicable when any of the above factors differ. For this reason the writer is inclined to use the method described below which is being used extensively in mills throughout the country.

The first problem is to determine what the weekly pay of the weaver should be and the number of looms which he can run efficiently. In order to demonstrate the method, we shall assume that the weaver is to run 20 automatic, 40 in. looms, for which he shall receive \$18 weekly. These looms will run at a speed of 160 picks per minute. By dividing the weekly wage of the weaver by the number of looms run, we obtain the weaver's piece-work rate per loom per week, in this case 90c ($\$18 \div 20$ looms). Weaving 68 by 72 at 85% efficiency this loom would turn off 151 yds. of cloth in a week of 48 hrs. The weaver's piece-work rate per loom week (in this case 90c) divided by the yards produced per loom week (in this case 151) gives us the weaver's piece-work rate per yard, or \$.00596, ($90c \div 151$ yds.). The piece-work rate per cut is obtained by multiplying the piece-work rate per yard by the yards per cut, hence a 60 yd. cut would cost \$.3576, ($60 \times .00596$).

This same method may be used to obtain the weaver's rate per cut for any fabric on any loom. If we use the same loom, at the same speed, efficiency, etc., to weave 80 by 80, the piece-work rate would be obtained as follows:

The production on 80 by 80 on a loom operating at 85% efficiency, running 160 picks per minute would be 136 yds. per loom week. We have previously determined the weaver's piece-work rate per loom week to be 90c, hence:

$90c \div 136 \text{ yds.} \times 60 \text{ yds.} = \$.3971$, weaver's piece-work rate per cut of 60 yds. on 80 by 80.

More simply stated, the weaver's price per cut for any fabric, after the weaver's rate per loom week and the yards per loom week at a reasonable efficiency have been determined, is obtained as follows:

$$\frac{\text{Weaver's Rate per Loom Week} \times \text{Yards per Cut}}{\text{Yards per Loom Week}}$$

Much trouble can be avoided by using care in setting the percentage of production on the fabric in question, as this is used in determining the production in yards per loom week, which is an important factor in the calculation.

The number of looms a weaver can run depends largely on the class of fabrics being woven, the physical condition of the loom and the layout of the weave room. The weekly wage of the weaver depends entirely on the wage scale in effect in the locality.

Starching Pajama Checks and Scrim

We would appreciate it very much if you could advise us a satisfactory formula for sizing or starching pajama checks and scrim so as to give the same feel and handle as the enclosed samples. (5745)

The following formulas should prove satisfactory as a starting point for sizing the pajama checks and scrim so as to duplicate the feel and handle of the samples submitted:

For the scrim the desired results should be obtained with

100 gals. Water

150 lbs. Feculose.

20 lbs. Japan wax emulsion.

To size the pajama check the following formula is recommended:

100 gals. Water.

40 lbs. Corn starch.

30 lbs. Dextrine.

25 lbs. Turkey red oil 25%.

The Japan wax emulsion may be prepared by melting 100 lbs. of Japan wax in 100 gals. of hot water, and then adding, with constant stirring, 10 lbs. of soda ash which has been dissolved in a little warm water. Feculose is a specially prepared starch product and may be obtained from the manufacturers, or products with similar properties may be procured from any of the larger manufacturers of dextrines.

In both cases, the sizing compounds may be applied on an ordinary two-bowl mangle, after which the goods are dried on cans and stretched to width on a tenter. It may be necessary to change the proportions of the ingredients used to exactly duplicate the finishes desired, but this should cause no great difficulty after one or two trials.

Stripes and Discolorations in Rayon Dress Tubing

Availing ourselves of the services of the Question and Answer page of TEXTILE WORLD, we would appreciate hearing from you as to what course you would recommend for the following problem: We are using 200 denier rayon, bought bleached and dyed white in the skein. This rayon is knitted by a two-thread process and when examining the finished product, in most cases we find stripes and discolorations which a wide variety of cleaning fluids fail to efface. In order to present this case intelligently to you, we are sending you a piece of material marked in this manner.

We have considered the alternative of redyeing the defective cloth in white, but cannot do so inasmuch as the same rayon is used for the blouse of the garment, being woven in jacquard effect with other colors. Dyeing the skirt part of the dress would therefore result in the white of the skirt being a shade lighter than that of the blocks in the blouse, making this phase of the solution impractical.

(5740)

Examination of this knitted tube of cloth led to the belief that some one "feed" of the machine was responsible for the horizontal stripe effect apparent in it. Since the stripe was much more prominent in some positions than others, the inference was that the defect was not a discoloration but a difference in texture which occasioned a difference in light reflection. The probable causes for this would be different yarn sizes or different stitch lengths.

To determine definitely just what was the cause, 120 yds. of yarn was ravelled and weighed. The length of yarn for exactly once around the tube was ravelled for eight courses and each course measured separately. The following results were obtained:

Feed	Average Length	Weight 120 Yds. in Grains	Denier of Two Ends
	One Course		
1	117.0 in.	80.4	429
2	122.0 in.	72.5	386
3	118.5 in.	70.2	374
4	116.5 in.	72.4	385

As the yarns were being ravelled, the ends from feeds 1 and 4 kept in step and so indicated that each had about the same length of stitch. The yarns from feeds 2 and 3 kept

lagging behind and so indicated that the stitch at the two feeds was longer than that drawn at feeds 1 and 4. Feed number 2 gave more trouble than feed number 3. The indications pointed out above are borne out by the measurement of the yarn from the four feeds. The conclusion is then that the feeds 2 and 3 draw longer loops than feeds 1 and 4, and especially that feed 2 draws a longer stitch than any of the others.

The sizing of the yarns shows that the two combined ends entering feeds 2, 3 and 4 are all about the same, being about 380 denier for an average while the two combined ends entering feed number 1 are almost 430 denier. To ascertain whether this extra weight was due to one of the ends being especially heavy, the two yarns were rec'd separately and again weighed and sized.

First End—41.4 grains=220 denier.

Second End—39.3 grains=209 denier.

This shows that the two ends are both above 200 denier and considerably above the average figure of about 190 denier for the other feeds.

With this heavy end at feed 1 and the long stitch at feed 2, the tendency is to exaggerate the difference in stitch to a point that is especially noticeable. Quite likely this heavy end might pass unnoticed in a fabric of this weight. The course with the loose stitch would probably be noticeable anyway.

There is no way of cleaning to remove this defect and if the fabric is dyed, it will very likely show a more pronounced defect except in dark colors. Our suggestion is that you first try to get a uniform stitch at all feeds. Then it seems as though the rayon should not show quite so much variation in size as from 380 deniers to 430 deniers.

Circulation of Liquor in Kier

Have you any records, made from actual tests, telling how many times it is necessary to circulate or throw-over the entire quantity of liquor in a boiling kier, to get the most satisfactory boil? We are aware that different type kiers, circulation systems, etc., would alter conditions, but we can make allowances suitable for our purpose, so any information you may have available will be helpful to us.

(5743)

As far as can be ascertained, no tests have been made to determine how many times it is necessary to circulate the entire quantity of liquor in a kier to get the most satisfactory boil. Owing to the fact that kier boiling is not at all a standardized practice, if any such tests have been conducted they would be of doubtful value. While proper circulation is of importance in procuring a satisfactory boil, it should be remembered that there are many other factors which influence the quality of the bleach. Some of the most important considerations are the size and type of kier, the construction of the goods to be processed, the treatment which the cloth has received preliminary to boiling, the method of packing the kier, the quality of water used, the composition and concentration of the kier liquor, the temperature and time of the boil, and the thoroughness of washing after boiling. It can be seen that with all these variables entering into the question of proper kier boiling, that what might prove to be sufficient circulation in one case would not be at all satisfactory in another.

One of the largest manufacturers of kiers states that in pump kiers the pumping apparatus should be so constructed that the entire quantity of liquor in the kier is circulated every twenty minutes. In bleaching some classes of goods an 8 hr. boil is often sufficient; and in this case the liquor would be circulated 24 times, providing it took the recommended 20 mins. for a throw-over of the entire liquor.

Steaming Crepe Twist

We are enclosing a quill of four-thread crepe on which we would like a little information. You will notice that this crepe is very wiry and no doubt has not been steamed long enough. Will you kindly advise us what is the correct length of time that a crepe of this nature should be steamed without doing any injury to the silk? (5723)

The quill of crepe twist is very wiry due to not having been steamed sufficiently. We would suggest that you try steaming this silk from three-quarters of an hour to one hour, which should be ample to remove any possibility of the silk snarling. As a general rule, thrown silk is not steamed this long, but it is sometimes necessary that the period of steaming be increased, and we think that this is an instance of that kind.

Shady Cloth from Shoddy and Cotton Mix

At the present time we are running stock consisting of 65% shoddy and 35% cotton, and we find the cloth when finished shows up shady. The lot when mixed is run through picker three times. The cards are in good condition but we cannot seem to overcome the shady places. Each lot is kept separate all the way through. If you could help us to remedy this trouble, I would be greatly obliged.
(5863)

The trouble is no doubt caused by unevenness in weight between top and bottom spools on the card. They should be kept separate in spinning and the yarn should be kept separate in weaving. Use at least three shuttles on the loom, if possible. Make more layers when laying up the batch for the mixing picker. If a blowing system is used, the stock should be forked in the bin while the lot is being blown in. Also see that the cards are being cleaned properly and at regular intervals.

Tinting Wool to Prevent Mixed Yarns

I have seen in a number of mills where they have trouble keeping the stains the same, where they stain the top either in the combing or drawing. The batch will start out just the shade they want it. Then they will use the same amount of color, etc., but the shade will change in the lot. We have tried mixing in bulk and by pailfuls at a time, but have the same trouble with variation in shade when the stock is in the yarn. I have seen men use the powder, mixed with cold water, with warm water, and with the oil and soap emulsion, yet it varied just the same. As one of your subscribers, I would like an answer as to the reason for this.
(5742)

The colors generally used for the purpose of tinting wool have so much affinity for the wool that it is necessary to exercise great care in the preparation of the solution and its application. The solution should be made to the required strength and then run, drop by drop, into the second bowl at the backwasher; or if added to wool in the drawing the solution may be dropped on the end just before it enters the eye of the flyer at the two-spindle gill box. The solution, if possible, should be agitated, thus maintaining a uniform mixture.

Different qualities of wool vary in color. Two lots of the same quality can vary, consequently where blending is done, no two lots can be exactly alike and so they are tinted differently, even when the same quantity has been applied. The variation in shade is not a very serious matter in the drawing. The object of tinting in the drawing is to prevent any danger of mixes occurring in the spinning, twisting, jack spooling and weaving departments.

In commission combing plants, where the object of tinting is to so camouflage the real color of the wool as to make it appear a good white, uniformity of shade throughout one lot is very desirable. The best way is to experiment with small samples, determine the correct strength, and then exercise care in the application. We never remember, where the stain is applied in the drawing, seeing two lots of the same quality that were tinted the same depth of shade, and in many cases "light" and "dark" bobbins would occur with frequency, but they were the right color, and after all it is the color that is wanted.

When the stain is applied at the backwasher, ample opportunity is afforded by means of the enormous number of doublings to blend thoroughly any variations in shade, so that each lot may be uniformly tinted. Mixing in bulk is the better plan. Mixing by pailfuls can only lead to variation in shades of the same color.

Some mills are very successful with emulsions, and we have seen some very excellent tinting done with emulsions. Fifty gallons or more may be safely made at one time. The required amount of dyestuff is put in a cheese cloth bag and suspended in the water in the tank. The water is brought to the boiling point first and boiled one hour to remove the temporary hardness, borax having been previously added. About 4 gals. of olive oil are added, and the mixture is boiled 30 to 45 min., enough borax being used to stabilize the solution. The best results are obtained when this emulsion is used hot. The water used is filtered river water and is very satisfactory for the purpose.

Beater and Fan Speeds

I wish to get your opinion on beater speeds on finisher pickers. My picking process is 1 bale breaker; 1 opener picker, 2 blade beaters, 2 beaters on the machine; 1 finisher picker, 1 blade beater. This is all. I run middling cotton. Breaker lap $12\frac{1}{2}$ oz. Finisher lap 10 oz. I run the beaters on the finishers 1,100 and the fan 1,100. Is this excessive? My dust and dirt from the screens goes through 30 ft. of trunk to the dust cellar. A friend of mine recommended 960 beater and fan speed. I do not agree with him. I do not think I could clean so well and I do not think that fan speed would blow the dirt, short cotton, etc., the whole length of the trunk to the dust room. And further, I think it would not draw the cotton up to the screen and hold it there. And if it did not, the cotton would roll in the space between the beater and the screen. Can you advise me?
(5718)

Without knowing anything about the staple of cotton being used, it is rather difficult to make any comment or offer any advice on this point. It seems to the writer that we have been guilty of greatly over-mauling cotton in our picking processes and in many instances we are still overdoing the beating act. A reduction in beater speed usually requires a higher fan speed in order to insure prompt motion of cotton from beater chamber to screens.

The laps which are being made are rather light and if the production is correspondingly small, it might be possible to beat less, provided enough air was provided to pull cotton to the screens promptly.

Emulsion for Carpet Yarns

What percentage of wool oil is commonly used in an emulsion for stock to make carpet yarns? How much emulsion would be used on a 5,000 lb. batch?
(5741)

Some stocks take more oil than others, but for scoured blends we make an emulsion of 50% oil and 50% water. Any kind of good wool oil may be used. The writer generally uses 15% of this emulsion to 100 lbs. of wool stock and gets very good results. But if the blend is not very dry or greasy, it is well not to use any more than 10%. This will give good results on such stock. The use of 750 lbs. of

emulsion to 5,000 lbs. of wool blend would generally be right. If your stock is too dry and your main cylinder is going too fast, it will drop too much stock.

Controlling Unwinding of Rayon in Shuttle

We are having trouble with our rayon filling slubbing off, causing shiners, breaking, etc. We are running this on a Draper automatic loom and a Draper shuttle with rabbit fur for tension. We think the tension is not right. We have heard of a mohair plush made especially for affording tension in shuttles in which rayon is being run, but we do not know where to procure this special plush. This plush is, according to accounts, about one-half inch deep and lies at an angle of about 45 deg. It is stuck on the side of the shuttle; and, when the bobbin is full, it lies flat. When the filling is depleted, it straightens out, thus providing an even tension the whole length of the bobbin. If you know of anything else that may be better, would greatly appreciate hearing about it. (5845)

Rabbit or cat skin is not suitable for the controlling of rayon filling when being woven in a Draper or any other kind of shuttle. Plush of any kind is much better, but it would be very unwise to use a plush with a pile one-half inch deep, because this would take up one inch of the space in the shuttle and give but little space for the transferring device to work.

Rayon is very hard to control when using this filling in an open-bottom shuttle, such as is used on the Draper looms. If the controlling agent extends very far from the sides of the shuttle, it is liable to be in the way of the transferring device. Whatever agent is used for the controlling of the filling, it is best to keep it well away from the head of the filling bobbin and it must not be permitted to lie on the end of the bobbin, because of the finger that steadies the end of the bobbin when a transfer is being made.

All that is necessary in the way of filling control is something that will just about touch the rayon on the outer layers and stop it from ballooning when these outer layers are being rapidly unwound from the filling bobbin. The idea is to stop the ballooning by the use of some device which will place a light pressure on the sides of the full bobbin of filling; and, whatever tension is applied, this tension must be located around the mouth of the shuttle.

We have found that ordinary slasher cloth is about as good as anything to use as a controlling device. This cloth is cheap, is easily applied, serves the purpose for which it is intended, and will last just as long as plush.

It would be well to investigate the winding of the rayon filling on the shuttle bobbins. In many cases, the slubbing off is caused by improper winding. We should advise reading the article "Two Common Defects in Rayon Fabrics," which appeared in the July 17 issue of TEXTILE WORLD. This article covers the ground very thoroughly.

Shaded Appearance of Vat-Dyed Goods

We are enclosing sample of cotton cloth dyed with vat colors in the jigger. You will notice the shaded appearance in these goods. Would it be possible for you to inform us what this is? We have dyed quite a number of batches. Some of them are quite clear and perfect, whereas others are like the sample. (5855)

The sample consists of a swatch of cotton cloth dyed a fairly dark shade of red and exhibiting a very noticeable shaded appearance irregularly over the entire area of the swatch. In dyeing deep shades with vat colors on the jigger, a shaded or mottled appearance such as shown on the sample frequently occurs. This tendency is more pronounced with some dyestuffs than with others. The shaded appearance is sometimes caused by foam on the dyebath, but more often is the result of uneven oxidation of the color on the cloth. If the goods are not run perfectly straight on the jigger, a pronounced mottled effect is often seen on the selvedge of the cloth wherever it has overlapped the roll.

Although several additions have been recommended to counteract uneven dyeing, it has been our experience that increasing the amount of hydrosulphite and caustic used in the dyebath is the most efficient method of overcoming this difficulty. In dyeing deep shades, 1 lb. of sodium hydrosulphite and 1 gal. of caustic soda of 54 deg. Tw. should be used to each pound of dyestuff in paste form. These proportions are considerably larger than are necessary when lighter shades are to be produced.

It is suggested that this particular shade could be duplicated with naphthol colors. Some of the naphthol colors are equal to the vat dyes in fastness to light, washing, and chemic; they are more easily applied to the fabric; and the cost of dyeing with them is considerably lower.

Cloudiness in Silk Stocking

With reference to the enclosed stocking, please advise us to what you would attribute the cloudiness or chafed surface of the silk. Our dyers maintain it is the quality of the silk. The silk commission house, through whom we make our purchases, say it is the dyeing. We understand you have ways and means by which you can ascertain just what it is, and we would appreciate hearing from you at your earliest convenience. (5703)

We have examined the stocking and feel that the silk has the appearance of the very best. While there are two rings or bands, these are not prominent. The average stocking would show more of the variations than this stocking does.

We notice a streaky appearance lengthwise of the stocking which you doubtless refer to as "cloudiness" and are inclined to believe that this is caused by letting the stockings dry out too much before boarding. Those portions of the stocking exposed to the air dry out more than the rest of the stocking, with the result that they have this difference in appearance after boarding.

We find a place or two where the stocking texture is pulled out of proportion in boarding, which also tends to make a variation in the appearance. However, this should disappear in the first laundering. One stocking is hardly sufficient grounds for judging the quality or defects of hosiery, but these comments may help to locate the trouble.

Qualitative Tests for Rayons

Will you please inform me of some simple means whereby the various types of rayons may be distinguished from one another and from silk. By this I mean how can I, in a small experimental laboratory, perform tests on various fabrics or yarns and tell which is viscose, nitrocellulose, lustron, celanese, etc. I shall appreciate any methods which you can give me. (5833)

The differentiation between real and artificial silk is easily accomplished by covering a small, light-colored or white sample ($\frac{1}{4}$ - $\frac{1}{2}$ gm.) of the mixed or separate fibers with a few drops of Millon's reagent. This test solution is made by dissolving metallic mercury in its own weight of con-

centrated c. p. nitric acid and diluting the solution with an equal volume of water. A brick red color develops in a few seconds in the presence of real silk. Rayon shows no color.

Only acetate silks (celanese and lustron) are appreciably or readily soluble in glacial acetic acid or hot acetic acid of greater strength than 65%. Acetate silk is also soluble in a mixture of 5 parts chloroform and 2 parts denatured alcohol.

Lustron gives a deep and permanent blue when brought to the boil with 10 to 15 cc. of a 0.1% solution of Methylene Blue and a small amount of acetic acid. If samples of lustron and celanese are treated together in this manner, the color will wash out to a very faint blue in the case of celanese, while the lustron will remain deeply colored. Acetate silks do not burn as do the regenerated cellulose silks (nitrocellulose, cuprammonium, and viscose) with a quiet, ready flame like the flame of burning bleached cotton. They fuse under the influence of the heat from a small flame, and a black knob or bead is formed which runs down the thread just ahead of the small sputtering flame which burns slowly. Burning regenerated cellulose emits an odor similar to that of burning bleached cotton cloth.

Wet nitrocellulose silk assumes a deep blue color when treated with a drop or two of a solution of 1 gm. diphenylamine in 100 gms. of concentrated sulphuric acid, while the other regenerated cellulose silks are uncolored. The blue nitrocellulose silk fiber dissolves in the test solution in a few seconds, imparting its color to the solution.

If both acetate silk and nitrocellulose silk prove absent, a staining test may be employed to distinguish between cuprammonium and viscose silks. Certain dyestuffs have a marked difference in affinity for these two types of rayon. Two such dyes are Erie Scarlet B and Sulphur Khaki Y, both of which dye cuprammonium silk much heavier than viscose. In this differential staining test it is well to use a small amount of color, 1% based on the weight of sample; equal weights of samples and equal volumes of dye-bath; and to immerse samples in bath at the same time, keeping them under the dye liquor for the same length of time.

Holes in Bleached Fabric

I enclose you two pieces of cloth, bleached and unbleached. The period of bleaching is one hour, then follows a cold water wash off of 20 min., after which the cloth is treated 20 min. in a bath containing 15 lbs. of bisulphite of soda and 1 oz. of basic blue to tint. You will perceive that small holes appear in the bleached piece. These cannot be seen when in the bleach machine but show up when passing through the tenter. Would you say the cloth was tendered or can you give us any theory as to the cause of this trouble? I would be pleased to receive an opinion on the quality of our bleach, considering that it is only a market bleach. Please do your utmost to let me have a reply as early as possible. The machine has been converted from a "Solozone" bleacher to a chlorine method bleacher and the bottom of the tank cemented to prevent pulping.

(5721)

We have examined very closely the damages, also looked over the method of procedure followed and the chemical treatment given for bleaching this fabric. It would appear to us as though the results were very good from the slight treatment given, although it is, of course, impossible for anyone not connected with the plant bleaching this material to definitely say just what can be accomplished. There is one open question in the writer's mind and that is as to whether the chlorine specified as being used for one hour may not be too strong. However, the fabric appears to be reasonably strong, particularly filling-wise, where the weakness as a rule develops from over-treatment with oxidizing reagents, such as chlorine. We should say that the quality of strength was such that it ought to be thoroughly marketable.

In the first place, the writer does not lay the damages resulting after the goods are tented to fault in the bleach, so far as chemical treatment is concerned. It is very evident that these goods have been dragged or nipped, either before processing or during the process of bleaching and finishing, and have come in contact with something sharp which has simply fractured the filling threads. The holes become apparent naturally when the goods are stretched on the tenter filling-wise. We would recommend that the inquirer look at his bleaching machines, and equipment through which the goods are passed previous to tenting.

It is possible that even a pin or needle imbedded in a roll of either wood or rubber could cause all the trouble.

As regards the writer's opinion on the quality of white, we suppose that this is probably a fabric which is marketed on a low price basis and manufactured under the cheapest possible conditions in the cotton mill, the owner or converter wishing to put out a fabric at a price. If such is the case, we should say that the white was a very fair product, particularly after the slight amount of treatment it has been given. In large production, of course, this class of merchandise could be bleached in a so-called Bennett kier which is simply a cylindrical-shaped wooden tank with false bottom, etc., having a pump for circulating the liquors, with a coil in the bottom for heating.

Goods are first given a soap boil to make them properly absorbent and then washed down, after which they could be chemicked or treated with chlorine through the use of the same pump, washed down with water after chlorine or chemicking, then be given a treatment with bisulphite of soda through the use of the pump also. The bluing could be accomplished afterwards on a light padder in connection with the tentering range. This is the manner in which this class of goods is being finished to some extent where a concern does not wish to use peroxide. As a matter of fact, peroxide could be used in the Bennett system in the same way and manner that the soap and chlorine are being used, and a better white would be produced. The usual size of Bennett tank would be large enough in capacity to hold 25,000 to 30,000 yds. of these shirtings.

Wool Cards Used for Cotton Waste

Please advise if it is possible to card cotton waste on a regular wool card, taking off a large number of ends on the condenser system. What would be the necessary changes in order to change a wool card to a cotton waste card? Also advise the type of loom on which spinning tape is usually woven. (5835)

Cotton waste yarns are made on regular wool cards very successfully, taking off from 48 to 30 ends per ring doffer, depending upon the size of the card, condition of the stock, etc. There would not be any extreme change necessary, and a good practical carder could make the necessary change from wool to cotton waste at very little expense.

The cotton waste should be dampened lightly to keep down the flyings and assist in the condensing of the roving. The excessive amount of the flyings from cotton waste on the wool system makes it necessary to use extra precaution against fires.

Spinning tape is usually woven on a tape loom especially constructed for the purpose. There are several types in use.

Serge Goods Shaded Side to Center

We are dyeing blue serge in the piece and frequently have trouble with the selvages being darker than the center of the piece. These goods are dyed six pieces at a time and run in six separate strings. Very often we find one or two pieces in the set with the sides dark and the center light. The other four or five pieces are all right. These goods are carefully scoured, six at one time, and some sets are crabbed. Some are not crabbed but both show the same result. What would you suggest to overcome this trouble? (5668)

There are several conditions that might cause goods to be shaded side to center. The most common one is uneven cooling of the goods and uneven moisture content. More mills every year are cooling and conditioning their goods as the final process of finishing in order to get away from this difficulty, and maintain goods in a natural state as regards moisture. There is probably no doubt that a cooling and conditioning machine would eliminate your trouble.

In regard to your processes, first start in at the washer. See that the goods are not crowded by using a small washer. Have enough water so that the goods will run smoothly. It is best not to go over 110 deg. F. in scouring, and in washing off it is safe to use water between 70 and 80 deg. F. Too high a temperature in scouring and washing has a great tendency to cause shaded goods by felting from the sides. If the goods are felted in scouring they generally show up dark sides and light centers.

After scouring you could cut off a heading and examine the nap to see if it is uniform across the piece. Before dyeing, it is a good policy to boil out the pieces with mono-pole oil, glauber salts, or ammonia, to insure the best results.

For dyeing, be sure to have the correct amount of water in the kettle; insufficient water will cause felting. Bring

the kettle up slowly to the boil; not less than one hour. Undue haste in bringing the kettle up quickly will cause bad work. After dyeing, cool down slowly. Oftentimes washing off too quickly will produce poor results.

If you were to tack a set of goods, dye them up, and still find you were getting shady goods, I would look to the scouring. Also observe where the pieces are running in the kettle. If the pieces that are shady are run in the same position each time, this will help to give you an idea if the dyeing is at fault. There is a bare possibility that the trouble might be due to carbonizing, but we do not think so. We would advise that you look into the benefits of the cooling and conditioning machine.

Amount of Silk in a Stocking

Can you inform me about the amount of silk that would be in a seamless 12-strand, 20 in., 240 needle hose? Also what would be the approximate cost of the silk and mercerized yarn, at today's market prices, for such a hose? Have you any particulars on hand as to the approximate different costs to make such a hose, including all operations, boxing, etc., without allowance for overhead or profit?
(5654)

There is apt to be quite a variation in weight for stockings of this sort, even when narrowed down to 12-strand, 20 in., 240 needle hose. From records of various full hose it seems that stockings of this class will weigh from 1.5 to 1.75 lbs. per dozen pairs.

The silk in these stockings is in the vicinity of 35%. The stitch and construction make some difference; for example, split foot stockings have no silk in the sole and some makers use a longer ring toe than others. However, 35% silk is a good average figure, and makes the actual weight of silk between 0.525 and 0.6125 lbs. of silk per dozen pairs.

There may be a little variation in the costs of yarns, depending on quality, but silk would probably cost about \$7.50 per pound and cotton about 88c per pound in the qualities to make a high grade stocking.

Labor costs are not readily available and vary some with different localities, so that it is not considered advisable to attempt to give figures.

Theory of Knitted Fabrics

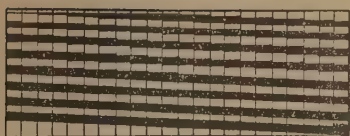
Your answer to our previous inquiry (No. 5650) received, also the answer to inquiry about the printed artificial silk. You have given us some very good and valuable information, but still you have not helped us out very much. In fact, I think you have made the problem more difficult than before.

In your letter you say that it requires 41 in. of material to make one course around the cylinder, and you also say that one space of black and one space of orange would just about cover one course. This makes it still harder for us to see how it would be possible to have five or six courses of one color.

We also notice that there is a gain of about 20 needles each time. However, this does not appear to be correct, as it is completely around the sock and not only a part of the course that is one solid color, either black or orange. We would appreciate very much hearing from you further if you can gather any further information for us. (5660)

Our first answer says that one course takes about 37.68 in. of yarn. This leaves about 3.32 in. of each printed yarn pattern in excess of one course. These 3.32 in. of yarn will make about 19 or 20 loops.

The black section of yarn goes a little over half way around the cylinder. The orange yarn goes the rest of the way and laps by the starting point of the black about 20 needles. The second black section then starts 20 needles ahead of the first black section and will go 20 needles beyond where the first section stopped. On each successive course the black advances 20 needles, and so on a 220 needle machine, it would require 11 courses to go clear around the machine. The twelfth course of black would knit on the same needles that the first section of black did. This is why it seems as if there are "five or six courses of one color." There would be a band of black apparently six courses and a band of orange apparently six courses. Each band to the casual observer is horizontal. This is not so. Each band is spiralling around the stocking, but because only half of the tube is seen at once and because the spiral goes around in so short a distance (12 courses), it seems horizontal. Think of a screw thread. The tooth is about the width of the space between teeth. This represents the condition in the stocking.

**Fig. 1**

The diagram at Fig. 1 shows how the yarns are in the tube. The tube is represented as cut open. Each horizontal line represents a course, using black and white in place of black and orange. The

vertical divisions represent 10 needles each.

In the stocking, each change from black to orange is not such a sharply defined step as in the upper part of the diagram. The lower part of the diagram eliminates the steps but shows the slanting line just the same. If the diagram is observed from a distance, the stripes are almost horizontal, and if half the diagram is covered, the horizontal effect is stronger. In the stocking leg, only half the tube is visible at once. Observe the place where one yarn breaks out and see how the black produces the gradually widening stripe, as indicated at the top of the diagram.

Silk Ribbon Warp Slips on Filling

I am enclosing a sample of ribbon made with a warp of China 20/22 raw, and a filling of 85 denier Tubize rayon, 76 picks to the inch, piece dyed. We are having trouble with the warp slipping on the filling in these goods, which we know occurs in the boiling-off and dyeing process. Could you advise me of any process or way to handle these goods to overcome the above trouble? (5852)

This trouble is primarily due, of course to the nature of the material in the texture of the webbing. The comparatively few silk warp ends are so spread out that they give no support to each other, particularly with this five-harness satin weave. It might be well to weave the material without edge-wires, as the loops on the edges formed by the wires give more room for the warp to slip on the already slippery filling.

We presume that the webbing was dyed in a piece-dyeing machine. If this is so, we would recommend skein dyeing. That is to say, the goods should be reeled into skeins and

dyed in the same manner as skein yarn. It might be advisable to use glass rods to hang the skeins of webbing in the dye tubs. There is very little strain on goods dyed in this manner when handled carefully. We would also advise placing the goods on a cheese-cloth or clean burlap bag while boiling off, and would have the bag emptied after boiling by being turned upside down, rather than having the goods hauled out of the bag by hand. This ought to overcome the trouble, if it is caused in the boiling-off process. It will probably be found necessary to run the goods through a wet-finishing machine to remove any wrinkles caused by dyeing. If so, care should be taken that no undue strain is placed upon the goods and that all rods and rollers are perfectly smooth.

Seaweed as a Textile Fiber

We wonder if you can supply us with information concerning the manufacture of seagrass or seaweed fabric. We wish particularly a list of concerns known to be experimenting or manufacturing either a yarn or a fabric from this fiber. (5841)

We have no knowledge of anyone in this country making use of such raw material, and it is also our belief that all foreign manufacture of seagrass yarns and fabrics have been of an experimental character. A seagrass of some kind, the exact nature of which we do not recall, was exploited years ago in England and other European countries as a substitute for wool—yarns and fabrics being actually produced—but we know of no one who is now engaged in such manufacture and no one who experimented with the grass in this country.

Of course Spanish moss (*tillandsia usetoides*) and another seagrass (*zostera marina*) are extensively used for the stuffing of mattresses and also for packing. Spanish moss is sometimes known as vegetable horsehair, but we know of no instances where it is being used as a textile fiber.

After the above was published we received the following comment:

I read your answer to the inquiry No. 5841, in reference to seaweed, which was published in the Aug. 7 issue of TEXTILE WORLD. Allow me to call your attention to the fact that large quantities of seaweed of Australian

origin have been used in Germany before and also during the war. I brought over from Germany samples of yarn and finished fabric, and these samples are in the possession of the Bureau of Foreign and Domestic Commerce, in Washington, D. C. I cooperated with the German mill in developing this fiber and I am thoroughly posted on the subject. However, it is not green but fossil seaweed which was being used, and it was spun on the woolen and also the worsted system. I shall be glad to give the inquirer more information upon request.

FELIX BRECHER,

25 Beaver St., New York.

Relative Speeds on Woolen Cards

Will you please answer the three following questions, if possible:

1. What is the least surface speed gain in inches that a tumbler roll on a woolen card must gain over a licker-in or leader roll in order to clear the leader on the general run of stock? We know that the greater the gain the better it will clear: but the question is, what is the least surface gain that will do the work?

2. What is the least gain of cylinder surface speed in inches over the tumbler necessary to clear the tumbler roll? We know the greater the surface gain of the cylinder over the tumbler roll the better it will clear the tumbler. But what we want to know is, what is the least surface gain that will do it on the average stock used in mills?

3. What surface speed gain of the fancy over the surface speed of the cylinder is generally necessary on the average stock used in a woolen mill in order to raise it for the doffers and clear the cylinder? We know there are many other things than the surface speed that affect the working of a fancy, but we simply want to know what is generally considered about the right surface gain over the cylinder?
(5828)

We are not aware of any experiments having been made to settle the points raised in questions 1 and 2. One authority states that a roll to strip should have a gain or lead of 50%. Below this speed there is a tendency for stock to be retained. It is interesting to note that practically all fancy speeds are below this figure.

Regarding the third question, from 10 to 25% lead is considered enough for the fancy, the slower speeds being

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used on the fine, lofty, neppy wools. A large fancy cannot be run at as high a speed as a small fancy. To prove this a fancy of $5\frac{1}{2}$ in. diameter was used. This was really a stripper roll covered with fancy fillet clothing. This fancy ran well with a lead of 48% over the cylinder speed and gave very good results.

Weighting Rayon

The writer would like information covering the weighting of rayon. What chemicals are generally used? Has any method been discovered whereby rayon can be treated and weighted in the skein at a temperature of around 70 deg. F., without damage to the finished material, or the weighting being removed in the dyeing process? Your reply will be greatly appreciated. (5691)

A silk dyer and chemist of wide experience replies to this question as follows: Up to the present time, I have not heard of the necessity of weighting rayon. If it is desired to weight this class of material in the skeins, the skeins should first be given a warm wash with 5% olive oil soap and 1% soda ash, then be well rinsed in warm water. Place the skeins which have been extracted, but not dried, in a solution of aluminium sulphate, 7 deg. Be. at about 70 deg. F. for one hour. Lay up and let drain and then wash in five changes of cold water. Then place in a silicate of soda bath, 5 deg. Be. at 70 deg. F. to 100 deg. F. for one hour. Wash well in warm water. The goods then may be dyed with direct cotton colors or basic colors.

Curl in Stocking Heel and Toe

We have had trouble with the decided curl in the stocking enclosed. We have been trying to eradicate this in the heel and in the toe of the sole without success. It was first noted in uneven dyeing. The stocking curled so tightly when it was wet that it would not dye evenly. The trouble has been blamed on the yarn which is 2-ply 70s, but it was found that two other makes of yarns gave the same trouble with this curl. We wonder if the trouble is due to the machine with possibly too tight a tension or some lack of adjustment. We are very anxious to know the reason for this curl in the goods and how to avoid it. (5666)

By carefully examining the sample submitted, we find that the trouble with the decided curl in the stocking is due mostly to the fact that the machine is not throwing up the same number of needles in the heel as in the toe. You will note by comparing the finished heel with the toe that the heel is much smaller, there being a much wider space between the extreme top of the gore in the heel than there is in the toe. This is due entirely to the fact that, in knitting the heel, there are not as many needles thrown out of action as there are in the toe.

You will find that by setting a machine so that exactly the same number of needles are thrown out of action in knitting the gore of the heel as are thrown out in knitting the gore of the toe, the trouble will be practically eliminated. You will still have some slight trouble of this kind, as it is practically impossible to eliminate it entirely, but it will be found that the more needles you rack out in both the heel and the toe, the less trouble you will have. We do not feel that this trouble is due to the yarn in any way.

Comparative Numbers of Silk Threads and Rayon

Can you advise us of comparative methods and tables for determining the count and yardage of silk winding threads as against rayon? We wish to determine the count and yardage of the Machine D Twist on silk, or a method of determining what the actual silk size is. We would also inquire if this is generally sold 16 ounces or 12 ounces to the pound. (5674)

Raw silk and rayon are sized, or numbered, on the denier-aune system, commonly known as the denier system. Without going into the detailed considerations on which this count is based, it is enough to say that the sizes of both these materials are determined by winding off exactly 450 metres and weighing this with weights of $\frac{1}{20}$ of a gramme, the number of these weights which balance the test skein being the size, or denierage for that test. If this is worked out, it will be found that a one denier silk (though there is no such thing in practice) will measure 4,464,528 yards per pound. Dividing this constant by the number of deniers will give the yards per pound, or dividing it by the yards per pound will give the number of deniers.

If the inquirer therefore wishes to know the denier size

which corresponds with Machine D Twist of silk, he should weigh up a given length, and by calculation find how many yards it runs to the pound. Then, dividing his denier constant by this yardage, he will get the deniers. Similarly, if he wishes to find what yardage he should get from a given size of rayon, or raw silk, he will, as stated above, divide the constant by the deniers.

It is to be here remarked that the specific gravity of rayon is substantially in excess of that of raw silk. The product of the different companies producing the material will vary in this respect, but generally speaking their statements that are made on this point seem to indicate that the specific gravity of rayon is 10% to 20% heavier than that of natural silk. Hence, 150 denier rayon would have a bulk, when held at stretch, corresponding approximately to 165 denier raw silk.

I believe it is customary now to sell twist silks sixteen ounces to the pound, though whether the practice is universal or not I do not know.

JAMES CHITTICK.

"Diagonally" Woven Canvas

We are attaching a sample of canvas which we have been told was woven diagonally in tubular form with a circumference of about 84-in. Will you please explain how this is done?
(5838)

The Crompton & Knowles Loom Works, Worcester, Mass., reply to this inquiry as follows: We feel very confident that the sample submitted was woven in the regular manner, and not woven diagonally. Several attempts have been made by various people to manufacture canvas diagonally, but it is our impression that all these attempts have been failures and they have ultimately reverted to the standard method of weaving this fabric. However, we know of some cases where this fabric has been woven tubular and then cut diagonally. This would give a very long strip of fabric which would appear to have been woven diagonally except for the fact that it would have no selvages.

Crepe de Chine Stretched in Finishing

Enclosed I am sending you two swatches of crepe de chine and would ask you whether the tendency of these goods to slip can be overcome during the dyeing and finishing process, or if it can be remedied during the manufacturing of the goods. Any suggestion which would give us the result would certainly be much appreciated. (5843)

This can be overcome in the dyeing or finishing, as evidently the goods have been made too narrow in weaving and have been stretched in finishing. The construction is correct, as many pieces of the same kind are being made today.

Dry Can Marks on Sulphur-Dyed Goods

Can you give me any information regarding the cause and method of preventing marks like those appearing on the enclosed swatch? This fabric is processed on continuous ranges as follows: singe; diastavor; wash in hot water; scour with soluble oil and soda ash; dry; dye with sulphur colors; wash; aftertreat with bichromate, bluestone and acetic acid; wash; and dry. The mark is an imprint of a soldered seam in a tinned steel dry can. These appear intermittently, showing up and disappearing with no apparent cause. Any information you can give will be appreciated. (5831)

The mark imprinted by the soldered seam of a dry can on the sulphur-dyed fabric is what is commonly called a lead stain. This stain consists largely of lead sulphide which is formed by the reaction between the sodium sulphide left in the cloth after dyeing and the lead contained in the solder. It is possible that a more thorough washing of the goods on the range, particularly between dyeing and after-treating, will eliminate the trouble. If, however, increased washing of the fabric before drying does not prevent occurrence of the stains, it will be necessary to use dry cans having brazed seams.

A well-known manufacturer of bleaching, dyeing and finishing machinery replies as follows: Trouble of this kind in the drying of sulphur-dyed goods has been previously experienced on continuous ranges. It is a well recognized fact that tinned cylinders are the only suitable drying equip-

ment from the standpoint of chemical reaction. Most concerns find copper drying cylinders detrimental, due to the black deposit which accumulates on the face of the cans and eventually stains the goods.

Other concerns have had similar trouble and we know of one case where a concern used a bath of about $\frac{1}{2}\%$ acetate of soda as a final chemical treatment immediately before the last two washes. Another practical dyer with whom the writer is very well acquainted informed us recently that he had been compelled to resort to aftertreating his goods with about $\frac{1}{2}\%$ soda ash, cold, as a final treatment before the last wash. The inquirer should also be sure that the seams in his tinned steel drying cylinders are absolutely steam tight.

Wet Roller in Jack Spooling Mohair

Please inform us as to whether using a wet roller with jack spooling either mohair or mohair and wool yarn is likely to cause cockling or other troubles? (5829)

We cannot see where it would make any difference. We know of mills which are constantly handling yarn spooled in that manner; and, although some of the yarn becomes very wet, they have never known it to cause any trouble of the nature suggested. In one of these mills, moisture tests of all the yarn are taken, and some run as high as 7% of moisture over the standard.

Weighting Sulphur-Dyed Khaki

I should like information about the weighting of sulphur-dyed khakis as it is done in the best plants. Is it possible to take a piece of 3.25 yd. goods, desize and scour it before dyeing, which will bring the weight down to about 3.60 and then add weight to finish 3.00 or heavier? It is necessary, of course, that the goods must not too obviously appear to be loaded. The finish must stand handling and pressing in the garment factory, must not deteriorate with age nor in a damp climate, and must not have any corrosive action on metal buttons, etc. Please let me have formulas if such is possible. (5830)

There should be no great difficulty in weighting the sulphur-dyed goods to finish to 3 yds. or slightly heavier. For

finishing the goods a range consisting of a 2-bowl mangle, a set of tinned dry cans, and a 60-ft. steam heated tenter frame is recommended. The cloth is passed through the weighting solution in the mangle, then on to the cans where it is partially dried, and finally on to the tenter where drying is completed and the cloth stretched to the required width. Without knowing precisely the handle and appearance which is desired, it is impossible to give an exact formula for finishing. These two recipes, however, have been used on a similar class of work in one of the large finishing plants. By using them as a starting point and then varying the proportions of materials used the inquirer should be able to produce satisfactory results.

- (1) 100 gals. Water
 45 lbs. Corn starch
 35 lbs. Dextrin
 25 lbs. 50% Turkey Red oil
- (2) 100 gals. Water
 50 lbs. Dextrin
 50 lbs. 50% Sulphonated tallow.

Increasing the amount of Turkey Red oil or sulphonated tallow gives a softer feel to the goods, while an increase in the amount of starch or dextrin produces a harsher finish. The addition of from 10 to 20 lbs. of stearic acid or Japan wax softener to either of these finishing baths is often advantageous.

A correspondent who is closely connected with the finishing of textile fabrics states that in the first place it is a rather difficult matter to weight goods without running some risk of putting them in such condition that there may be serious after-effects from the chemical ingredients in the finish. He suggests trying the following on a small short run of this fabric as a test:

After dyeing, the goods should be well mangled on a 3-roll water mangle, and if convenient at least partially dried. They should then be run over a regular 3-roll starch mangle with about 80 lbs. of corn dextrin, 30 lbs. corn starch, 2 gals. of 50% Turkey Red oil or some equally efficient softener. The same mixture would include about 100 lbs. Epsom salts and 1 gal. of glucose, with from $\frac{2}{3}$ to 1 qt. formaldehyde.

This formula should weight the goods materially and if

they are a little too stiff for the finish desired, it is of course necessary to cut down the amount of starch. A finish requiring calendering could probably stand a little more starch, but the finisher should be careful that the goods are not conditioned too heavily on the sprinkler before calendering.

It will probably be found necessary to tint the starch with a little of the dye liquor used for dyeing the absolute shade, in order to keep the tone of the goods correct. The writer has seen the above formula used to very good advantage on certain lines of low-grade drills dyed sulphur black and logwood black where weight was desired.

Temperature for Drying Yarn in Skeins

In drying yarn in the skein, please advise what are the limits of temperature required for drying? Could you explain to us the best methods used in drying yarns?

(5900)

Such an inquiry on drying yarns should tell a little more about the material in question. Lacking this information, the answer will be based on ordinary cotton yarns, but the same principles apply in a general way to all other yarns, extra precautions being necessary in some cases, particularly with some forms of rayon.

As to temperature, probably everyone who has had experience will say to dry at the lowest temperature that will give the desired production. Actually, very little drying is done by exposing to air at the ordinary temperature, while a great deal is done above 212 deg. F. From the standpoint of "feel" and ability to regain moisture, moderate temperatures are better. This is especially the case after bleaching, when excessive heat often turns the goods yellowish or brown. The higher the temperature, also, the more chance there is for damage from traces of chemicals left in the goods, like acids in cotton or alkalies in wool.

The term "best methods" is purely relative, for the quantity of yarn to be handled and the use to which it is to be put are the determining factors.

For moderate production, the ordinary truck dryers are very good. Trucks are loaded with poles carrying the yarn, then pushed into dryers properly equipped with steam coils and circulation fans. For larger production there are long

continuous dryers. The wet yarn is fed at one end on poles, passes through and comes out at the other end still on the poles. Data on these two methods, including the latest improvements, can be obtained from manufacturers who advertise in TEXTILE WORLD.

Some plants have built-in dryers or dry-rooms which are constructed and operated largely according to their own ideas. In some cases the yarn is hung in the room on poles as it is processed through the day, and then dried at a moderate temperature during the night.

It is usually considered the best practice in all drying to use as much air circulation as possible in order to get high drying efficiency without too high a temperature. Too vigorous motion of the air, however, may tangle skein yarn.

Breaking Strength of Rayon

Some time ago I had a copy of your 1925 Rayon Annual, in which there was an article on the breaking strengths of rayon. I no longer have the copy before me but, as I remember it, the strengths given were as follows:

Raw Silk.....	350 grams per den.
Acetate Rayon.....	130 grams per den.
Wood Pulp Rayon.....	150 grams per den.
Linters Rayon.....	170 grams per den.

Recently, I had occasion to use information of that sort and, on conferring with manufacturers of rayon, I find that they only claim a strength of from 0.70 grams to 1.60 grams per denier.

Do you suppose that there is a mistake in the placing of the decimal point in the article in your rayon number, or were the tests upon which that test was made based upon skein breaking rather than single thread breaking? Any further information you can give me will be deeply appreciated.
(5888)

The table for strength in grams per denier of raw silk and three rayons, given in our 1925 Rayon Supplement, all have decimals after the first figure at the left, or as follows:

Raw Silk	3.50 grams per den.
Acetate Rayon	1.30 grams per den.
Wood Pulp Rayon	1.50 grams per den.
Linters Rayon	1.70 grams per den.

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It was stated in the introduction to this table that the tests were for the best grades of raw silk and rayon. The tests were also made on the materials when in equilibrium with a standard atmosphere. Undoubtedly there would be a wide variation on different lots of the same manufacture and of course humidity differences would cause a wide variation in strength and stretch. The table that we published was furnished by Dr. W. F. Edwards, of the United States Testing Co., New York City.

Fuzzy Places in Seamless Silk Stocking

We desire to address you in reference to the trouble we are having with seamless silk stockings. The sample attached will illustrate just what trouble we are having. If you will glance across the boot of this stocking you will note a fuzzy appearance of the silk, and you will also note several places where the fiber seems to have been "picked up." We have not experienced any difficulty in knitting this silk, therefore, it does not seem possible to us that the silk itself is at fault. However, the bad silk might have been run on the machines without giving noticeable trouble. We will greatly appreciate your looking into this matter promptly for us. (5631)

The fuzzy appearance of this boot seems to be due to poor silk yarns. When examined under magnification, there are places which have the appearance of having been knitted of "lousy" silk. At some of these places there are several fibers not incorporated in the strand of yarn but knitted with it into the loop. This would indicate that there were these loose ends in addition to the regular strands. While these knit in at some places, at other places they do not, and then they project through the fabric to the surface and make the particularly noticeable fuzzy spots.

This particular stocking seems to have a change of yarns in the upper part of the boot because the texture is more open or sleazy in the middle of the boot than at the top of the boot. The fuzzy spots do not appear until the apparent change in yarns, so it may be that a different size and quality of silk was used by mistake. This might come from a change of cones or from a mistake in originally winding onto the cone.

When analyzed, the yarn from the lower part of the boot was kept separate from that of the upper part of the boot.

There was a knot at the point where the change in texture came, indicating that either a new cone was tied in at this point or a different spool from the throwing in the original winding.

The yarn lengths, weights, and equivalent deniers are listed here:

	Yards	Grams	Denier
Top	120	1.297	106.2
Lower	210	1.895	88.9

This indicates a different size of yarn in the fuzzy section, if not a different quality.

Setting Ratch on Cap Spinning Frame

I would like to ask if there is any advantage in setting the ratch on a cap spinning frame a distance that is 2 in. longer than the longest fibers? The stock is mohair, the count 20s. (5639)

The question does not give much information. There is much that enters into a consideration of why this is done. In the first place, mohair is very strong, and it cuts the rollers very fast if the ratches and drafts are not proper. Even under ideal conditions, the ratch has to be set longer to keep the curl out of the yarn. On days when the humidity runs high, ratches have to be moved back quite often to keep the curl out of the yarn. It is a very common thing for mohair to be ratched longer than the stock; also for carriers to be wide open and the wooden carriers to be taken off a row to allow the twist to run out so it will draw apart easier. The kind of mohair that is used has a lot to do with the matter; also the stock or blend. All have their own different qualities and have to be treated differently in order to get a good even yarn and maintain luster. The question of ratching really starts with the sorting of mohair, and the way it is handled in all the other operations before going to the spinner. It is a very deep question and a lot could be written about it. Briefly, it depends on stock, counts and local conditions, and probably long experience is the only thing that will enable a man to answer the question correctly in all cases.

Preparing Backfilling Mixture

We have been having some trouble with the winter wheat flour in our backfilling size, and we are wondering if you could aid us in this matter. We have been filling the size tub with water and adding blue; then heating to about 120 deg. F.; then adding a tallow softener which is broken up into small particles; then winter wheat flour; then rosin size which is dissolved in warm water before putting in the size tub; then corn starch; potato starch; and talc. This is agitated and brought up to a boil and boiled for three minutes. We find that the size is smooth with the exception of small lumps of the winter wheat flour, which upon breaking are dry and powdery and untouched by the water. We would be pleased to have you advise us if you think we are adding the different materials in the wrong order, and will appreciate any information you may be able to give us. (5670)

Apparently the manner in which the winter wheat flour is being mixed into the starch tub is causing the entire trouble. The flour should be wet down and rubbed through a fine screen, or otherwise made into a paste of standard mixture so that the proper amount can be properly added to the starch mixing. It is as a rule necessary to handle wheat flours in this manner in order to avoid the disagreeable feature of lumps forming.

Asbestos Felts

In your issue of August 28, I note an article on hardening felts, which prompts me to ask you to please inform me how to harden asbestos felts. Any information will be greatly appreciated. (5898)

Hardened felts, as described in the recent article, refer to fabrics composed of wool, hair and combinations of similar fibers. Animal fibers under the action of heat, moisture, a lubricant (such as soap), and intermittent pressure, proceed to adhere and interlock themselves into a permanent mass. Asbestos, although fibrous, is not a fiber. It is, however, sometimes mixed with hair and felted on a platen hardener. The principal parts of these machines are two flat, heavy cast-iron platens about 96 in. by 48 or 64 in.,

lying horizontally, and so constructed that one or both vibrate in a horizontal plane, 500 to 700 times per minute, with a stroke of $\frac{1}{8}$ to $\frac{1}{2}$ in. Water and steam are applied which together with the action of the platens compress and harden the fibers into a compact sheet. We doubt whether felt made wholly of asbestos fiber would respond to this hardening treatment, however.

The term "asbestos felts" is also applied to some forms of roofing paper and sheets. These are composed of asbestos fiber and paper or other material, or asbestos alone, and are hardened by passing in a warm and moist state between heated rolls, or under a heated plate press. Such products are hardly within the field of the textile industry.

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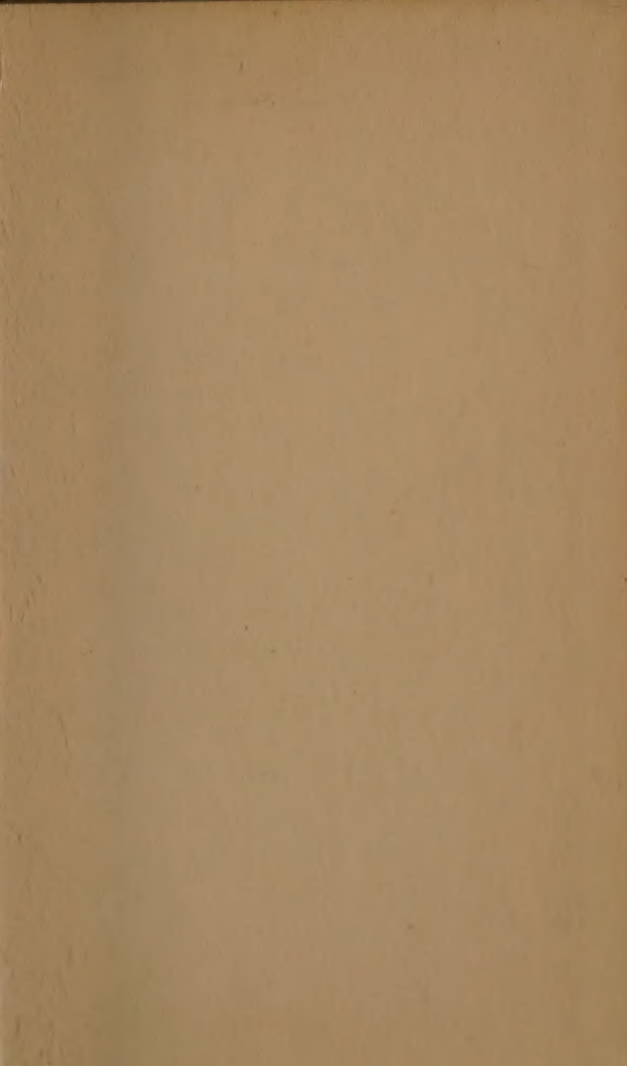
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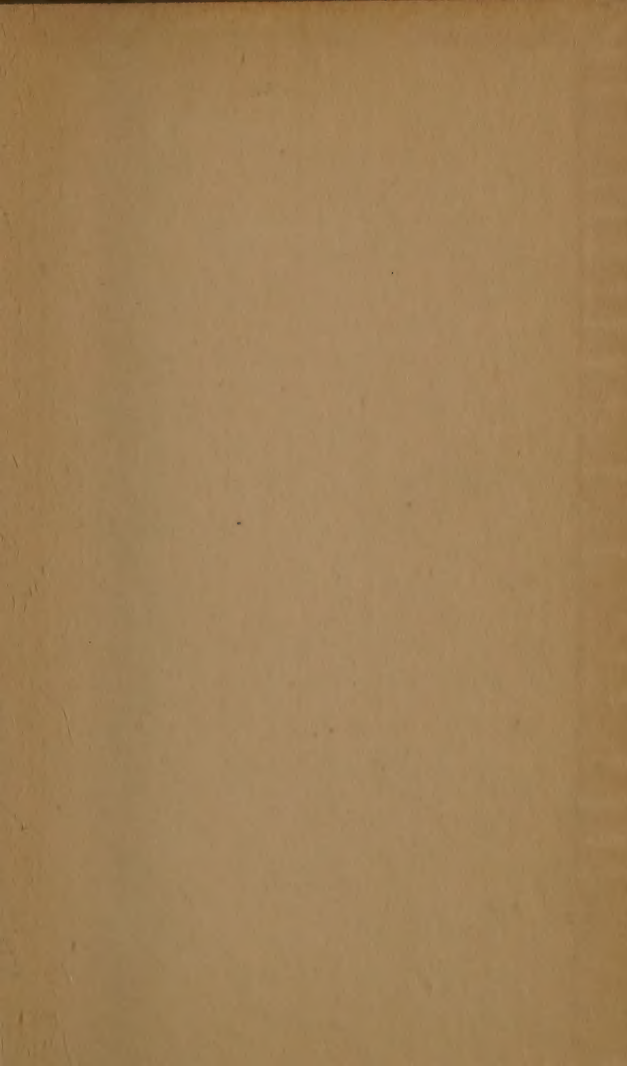
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